TM 11-2607G

WAR DEPARTMENT TECHNICAL MANUAL

RADIO TRANSMITTER BC-400-G

RESTRICTED. DISSEMINATION OF RESTRICTED MATTER. No person is entitled solely by virtue of his grade or position to knowledge or possession of classified matter. Such matter is entrusted only to those individuals whose official duties require such knowledge or possession. (See also paragraph 23**b**, AR 380-5, 15 March 1944.)

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WAR DEPARTMENT
Washington 25, D. C., 1 December 1944

TM 11-2607G, Radio Transmitter BC-400-G, is published for the information and guidance of all concerned.

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BY ORDER OF THE SECRETARY OF WAR:

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Chief of Staff.

OFFICIAL:
J. A. ULIO,
Major General,
The Adjutant General.

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No. 11-2607G

WAR DEPARTMENT
Washington 25, D. C., 1 December 1944

RADIO TRANSMITTER BC-400-G

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DESTRUCTION NOTICE

DESTROY EVERYTHING

WHY — To prevent the enemy from using or salvaging this equipment for his benefit.

WHEN — When ordered by your commander.

HOW — 1. *Smash* — Use sledges, axes, handaxes, pickaxes, hammers, crowbars, heavy tools, etc.

2. *Cut* — Use axes, handaxes, machetes, etc.

3. *Burn* — Use gasoline, kerosene, oil, flame throwers, incendiary grenades, etc.

4. *Explosives* — Use firearms, grenades, TNT, etc.

5. *Disposal* — Bury in slit trenches, fox holes, other holes. Throw in streams. Scatter.

USE ANYTHING IMMEDIATELY AVAILABLE FOR DESTRUCTION OF THIS EQUIPMENT

WHAT — 1. *Smash* — Meters, switches, crystals, tubes, sockets, relays, terminal strips, resistors.

2. *Cut* — All terminal wires and wire wherever exposed, all cables in several places.

3. *Bend or break* — All panels, all chassis, tuning capacitors and coils, voltage regulator.

4. *Burn* — Everything, including all papers and books.

5. *Bury or scatter* — Everything.

DESTROY EVERYTHING

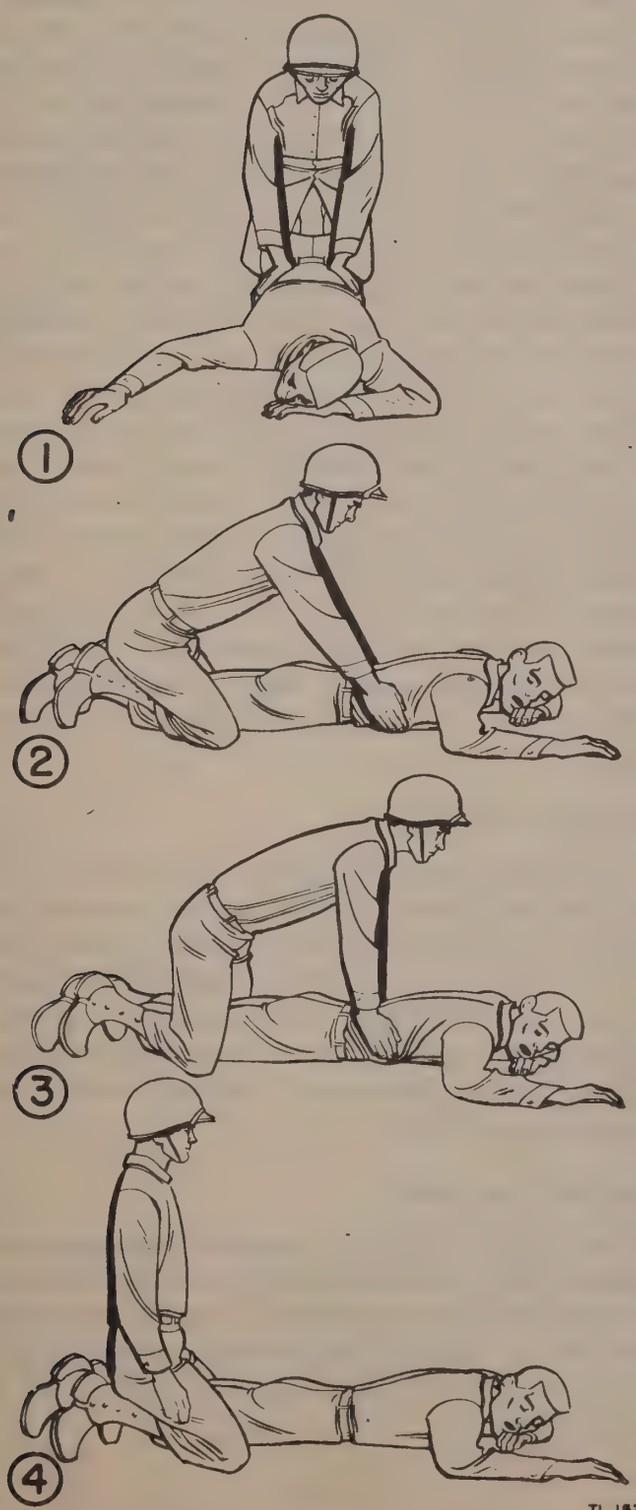
SAFETY NOTICE

Radio Transmitter BC-400-G uses high-voltage power supplies at potentials that may cause death. In handling this equipment, use your head. Think, FIRST! Do not depend upon the action of door interlock switches for safety. Disconnect input power line outside the cabinet before making repairs or adjustments within the cabinet.

FIRST AID FOR ELECTRIC SHOCK

I. RESCUE

a. In case of electric shock, shut off the high voltage at once and ground the circuits. If the high voltage cannot be turned off without delay, free the victim from contact with the live conductor as promptly as possible. Avoid direct contact with either the live conductor or the victim's body. Use a dry board, dry clothing, or other non-conductor to free the victim. An ax may be used to cut the high voltage wire; however, be watchful of electric flashes which may result disastrously.



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II. SYMPTOMS

a. Breathing stops abruptly in electric shock if the current passes through the breathing center at the base of the brain. If the shock has not been too severe, the breathing center recovers after a while and normal breathing is resumed, provided that a sufficient supply of air has been furnished meanwhile by artificial respiration.

b. The victim is usually very white or blue. The pulse is very weak or entirely absent and unconsciousness is complete. Burns are usually present. The victim's body may become rigid or stiff in a very few minutes. This condition is due to the action of electricity and is not to be considered rigor mortis. Artificial respiration must still be given, as several such cases are reported to have recovered. The ordinary and general tests for death should never be accepted.

III. TREATMENT

a. Start artificial respiration immediately. At the same time send for a doctor, if assistance is available. Do not leave the victim unattended. Perform artificial respiration at the scene of the accident, unless the victim's or operator's life is endangered from such action. *In this case only*, remove the victim to another location, but no farther than is necessary for safety. If the new location is more than a few feet away, artificial respiration should be given while the victim is being moved. During transportation, other methods of resuscitation may be used, if the method of transportation prohibits the use of the Shaeffer prone pressure method. Pressure may be exerted on the front of the victim's diaphragm, or the direct mouth to mouth method may be used. Artificial respiration, once started, must be continued, without loss of rhythm.

b. Lay the victim in a prone position, one arm extended directly overhead, and the other arm bent at the elbow so that the back of the hand supports the head. The face should be turned away from the bent elbow so that the nose and mouth are free for breathing (figs. ① and ②).

c. Open the victim's mouth and remove any foreign bodies, such as false teeth, chewing gum, or tobacco. The mouth should remain open, with the tongue extended. Do not permit the victim to draw his tongue back into his mouth or throat.

d. If an assistant is available during resuscitation, he should loosen any tight clothing to permit free circulation of blood and to prevent restriction of breathing. He should see that the victim is kept warm, by applying blankets or other covering, or by applying hot rocks or bricks wrapped in cloth or paper to prevent injury to the victim. The assistant should also be ever watchful to see that the victim does not swallow his tongue. He should continually wipe from the victim's mouth any frothy mucous or saliva that may collect and interfere with respiration.

e. The resuscitating operator should straddle the victim's thighs, or one leg, in such a manner that:

(1) The operator's arms and thighs will be vertical while applying pressure on the small of the victim's back (fig. ③).
(2) The operator's fingers are in a natural position on the victim's back with the little finger lying on the last rib.
(3) The heels of the hands rest on either side of the spine as far apart as convenient without allowing the hands to slip off the victim (fig. ①).
(4) The operator's elbows are straight and locked.

f. The resuscitation procedure is as follows:

(1) Exert downward pressure, not exceeding 60 pounds, for one second.
(2) Swing back, suddenly releasing pressure, and sit on the heels (fig. ④).
(3) After two seconds' rest, swing forward again positioning the hands, and apply pressure for another second (figs. ① and ③).

g. The forward swing, positioning of the hands, and the downward pressure should be accomplished in one continuous motion, which requires one second. The release and backward swing require one second. The addition of the two second rest makes a total of four seconds for a complete cycle. Until the operator is thoroughly familiar with the correct cadence of the cycle, he should count the seconds aloud, speaking distinctly and counting evenly in thousands. Example: one thousand and one, one thousand and two, one thousand and three, one thousand and four, etc. This method of counting insures accurate timing. The exact frequency of the operating cycle of resuscitation is of utmost importance.

h. Artificial respiration should be continued without interruption until the victim regains normal breathing or until pronounced dead by a medical officer. It may be necessary to continue resuscitation for several hours. For this reason relief operators should be used if available.

IV. METHOD OF RELIEVING OPERATOR

a. The relief operator kneels beside the operator, assuming the same position on an imaginary victim, and follows the operator through three or four complete cycles. When he is sure that he has the correct rhythm, on the next forward swing of the operator the relief operator places his hands on the top of the operator's hands without applying pressure. This indicates to the operator that the relief operator is ready to take over. On the backward swing, the operator moves off the victim, to the side, and the relief operator takes the position of the operator. On the next forward swing, the operator being relieved assumes the position on an imaginary victim beside the new operator, and follows through two or three complete cycles of the new operator, or until he is sure that the new operator has the correct rhythm. The operator being relieved remains alert to take over instantly if the new operator should falter or hesitate on the cycle. During the process of relief, the original operator should count aloud, by thousands, to give the relief operator the correct timing.

V. INHALANT STIMULANTS

a. If an inhalant stimulant is used, such as aromatic spirits of ammonia, the individual administering the stimulant should first test it himself to see how close he can hold the inhalant to his own nostrils for comfortable breathing. Be sure that the inhalant is not held closer to the victim's nostrils and then only for a short duration, one or two seconds every minute.

VI. LIQUID STIMULANTS

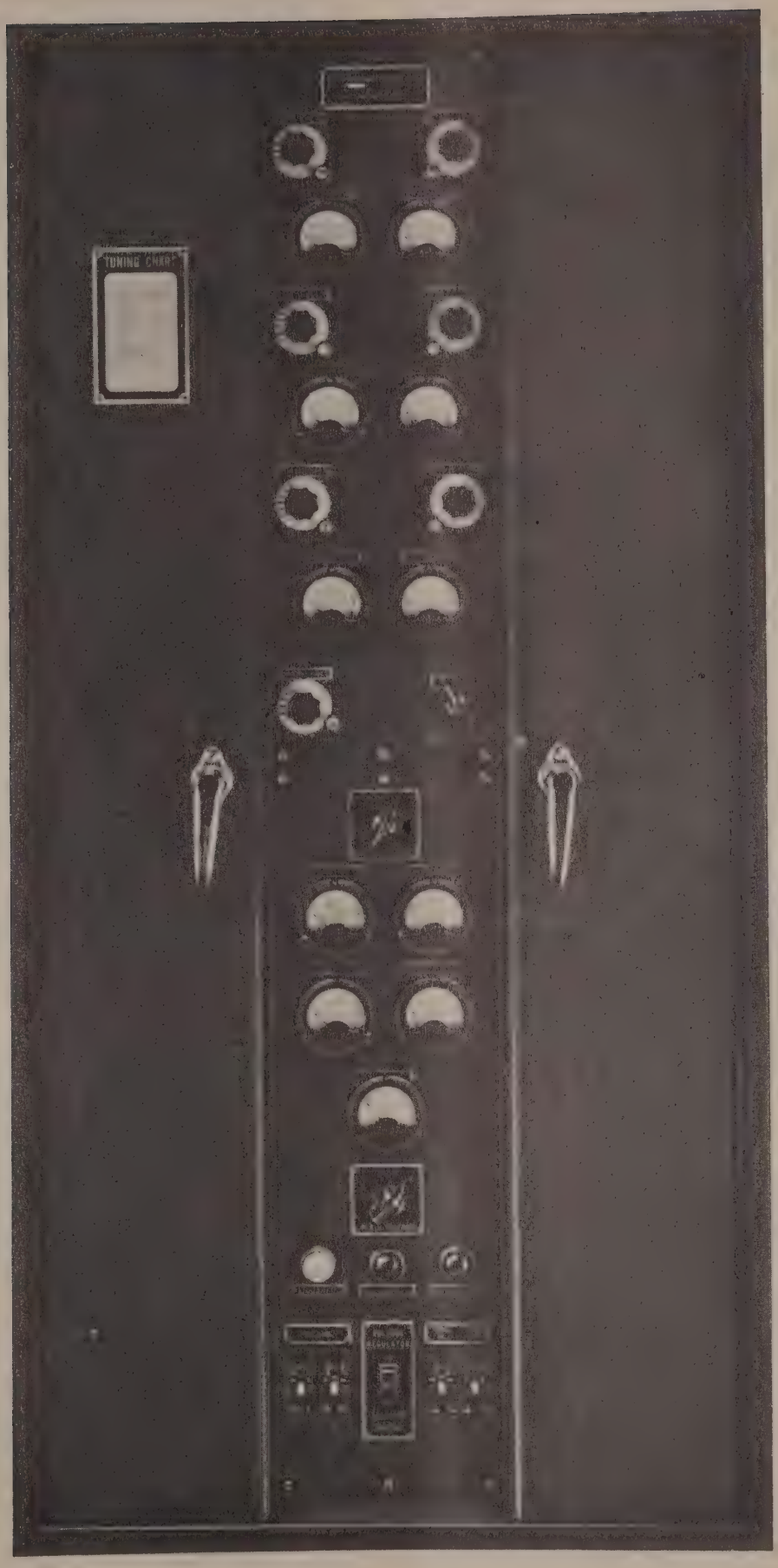
a. After the victim has regained consciousness, he may be given a glass of water with ½ teaspoon of aromatic spirits of ammonia added, or he may be offered hot coffee or hot tea as a stimulant. DO NOT GIVE AN UNCONSCIOUS VICTIM ANY LIQUIDS.

VII. CAUTION

a. After the victim revives, keep him lying quietly. Do not allow him to get up and walk even though he may feel that he is strong enough. Any injury which a person might have received, including electric shock, may bring about a condition of shock or fainting. This condition should be guarded against at all times. Shock is present if the victim is pale and has a cold sweat. His pulse is weak and rapid and his breathing is short and gasping.

b. Keep the victim lying flat on his back, with his head lower than the rest of his body, and his hips elevated. Be sure that no tight clothing restricts the free circulation of blood or hinders natural breathing. Keep him warm and quiet.

c. A resuscitated victim may suddenly stop breathing and require additional artificial respiration. For this reason, he must be carefully watched. NEVER LEAVE A RESUSCITATED PERSON ALONE UNTIL IT IS *CERTAIN* THAT HE IS FULLY CONSCIOUS AND BREATHING NORMALLY.



TL 10673

Figure 1. Radio Transmitter BC-400-G.

Section I

DESCRIPTION

1. GENERAL

a. Radio Transmitter BC-400-G is used to inform aircraft of strategic geographical points by radiating a constant signal on a fixed frequency of 75 megacycles. A crystal oscillating at a frequency of 4166.667 kilocycles (1/18 of carrier frequency) determines multiplier frequencies. A tone oscillator feeding into the audio amplifier produces a modulation frequency of 3,000 cps.

b. Installation essentials consist of a radio transmitter, a suitable source of power input, transmission line, and a radiating system.

2. COMPONENTS

Quan.	Components	Dimensions (inches)			Weight (lb)
		High	Wide	Deep	
1	Packing case (packed)	70	30	25	550
1	Radio Transmitter BC-400-G (2C6380G)	50¼	24	21½	350
2	Tube kits (2C6380G/T1)				
1	Kit of spare parts (2C6380G/SP)				
2	Crystals (in Crystal Holders FT-164, 2Z3524-4166.667)				
2	Technical Manuals TM 11-2607G	11	8½	½	

3. MECHANICAL DESCRIPTION

a. Doors. The transmitter is housed in a black, wrinkle-finished steel cabinet (figs. 1, 2, and 3) having a rear door and two front doors. The front doors do not completely cover the entire front panel, but leave a recessed vertical strip at the center, about one-third the width of the front surface. On this strip are mounted all controls, switches, and meters used in adjustment and operation. Any door opens independently, but opening any door removes plate voltages by releasing an interlock safety switch. (See figs. 2 and 9 for interlock openings.) Each door has a handle which actuates a double catch-bar and locks the door.

(1) *Open rear door to:*
- *a.* Change tubes
- *b.* Change crystals
- *c.* Adjust neutralization
- *d.* Connect power lines and ground
- *e.* Check the voltage regulator (fig. 9)
- *f.* Get at a-c input terminal strip

(2) *Open left front door to:*
- *a.* Replace modulation meter fuse
- *b.* Calibrate modulation meter with R4
- *c.* Test terminal strips or remove units

(3) *Open right front door to:*
- *a.* Adjust or replace relays
- *b.* Test terminal strips or remove units

4. ELECTRICAL DESCRIPTION

a. Operating Characteristics.

Power supply	95-125 v, 60 cycles a-c
Power input (unmodulated)	450 watts
Power input (modulated)	460 watts
Power factor	78% lagging
Carrier output (unmodulated)	5 watts
Carrier output (modulated)	7½ watts
Output frequency	75 megacycles ± 7,500 cps
Antenna load impedance	100-600 ohms
Permissible modulation	100%
Modulation frequency	3,000 cps
Distortion permissible at 3,000 cps	10%
Operating temperature	− 15 C to + 50 C
Operating humidity	0-100%
Carrier noise	Less than 2%

b. Vacuum Tube Complement.

Quantity	Symbol	Army Type	Commercial Type
3	V1, V9, V16	VT-84	84
4	V2, V3, V4, V5	VT-96	6N7
1	V6	VT-66	6F6
2	V7, V8	VT-115	6L6
2	V10, V11	VT-287	815
4	V12, V13, V14, V15	VT-145	5Z3

5. RADIATING SYSTEM

Use any impedance load from 100 to 600 ohms.

6. POWER REQUIREMENTS

Use any adequate power source from 95-125 volts, 60 cps, 500 watts.

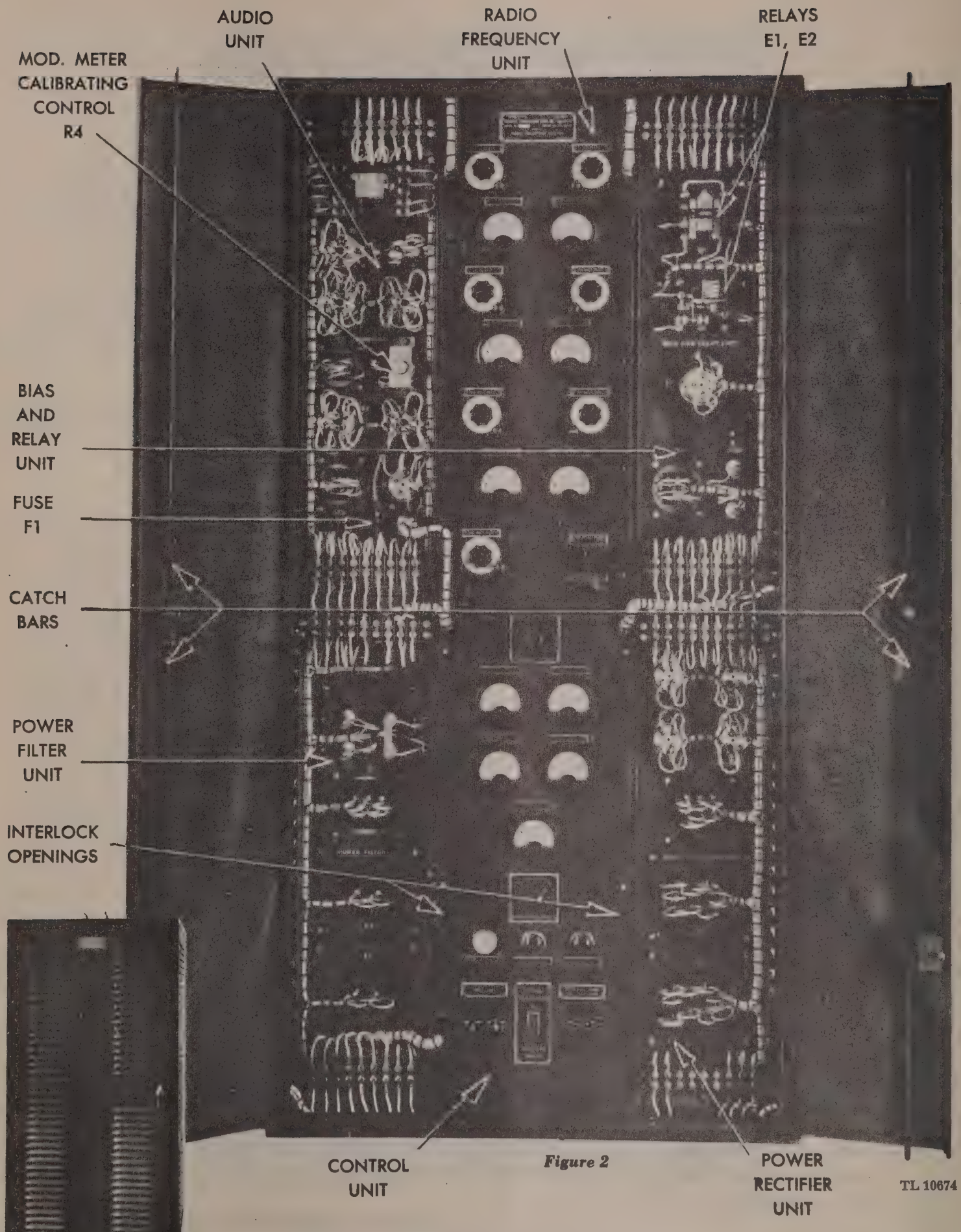


Figure 2

TL 10675 *Figure 3*

Figure 2. ***Radio Transmitter BC-400-G, front doors open.***

Figure 3. ***Rear view of cabinet.***

Section II

INSTALLATION AND OPERATION

7. UNPACKING

a. Packing Case. The packing case of Radio Transmitter BC-400-G is 25 by 30 by 70 inches high. The case and contents weigh 550 pounds.

b. Contents of Case. The case contains the following:

(1) 1 Radio Transmitter BC-400-G
(2) 1 Kit of spare parts
(3) 2 Kits of tubes
(4) 2 4166.667 kilocycle crystals in Crystal Holder FT-164
(5) 2 Technical Manuals TM 11-2607G

c. Method of Unpacking (Figs. 4, 5, and 6).

CAUTION.—Use extreme care when unpacking to prevent damage to the equipment. *Do not apply pressure to the meter faces.* Always keep the transmitter as near upright as possible.

(1) Place the packing case as near to where the transmitter is to be operated as convenient.

(2) Cut the steel straps that bind the case.

(3) Remove the front of the case, marked "OPEN THIS SIDE," using a *nail puller.* PRYING OFF THE FRONT OF THE CASE WITH A CROWBAR OR SUCH MAY DAMAGE THE EQUIPMENT.

(4) Remove: (*a*) The excelsior
(*b*). The two crystal boxes
(*c*) Two tube kits
(*d*) Spare parts kit

(5) Remove the back, sides, and top of the packing case. By using a nail puller to remove the nails around the base of the case, this may be done without completely knocking down the case.

(6) Remove all protective wrapping from the transmitter.

(7) Remove the tape from the beaded leads, antenna coupling, and Navy Type D resistors.

(8) Remove the four bolts that hold the transmitter to the packing case skid as follows: Carefully tilt the transmitter backward, and then forward, just far enough to loosen the screw heads on the under side of the skid with a screw driver. *Do not remove them—only loosen them.* Restore the transmitter to upright position and complete removal of the bolts with the fingers or by using pliers.

(9) Inspect the equipment for visible damage after unpacking, so that it may be repaired before attempting operation. If it is necessary to clean the transmitter, use a brush or blower.

8. INSTALLATION OF TRANSMITTER (Figs. 7 and 8)

a. Table or Mounting Platform. Provide a safe, solid table or mounting platform for the transmitter, not less than 2 feet high, and bolt the transmitter onto it. (See figs. 7 and 8 for location of bolt or screw holes.) To assure a minimum of vibration, secure the mounting to the floor.

Note.—After cabinet has been mounted, further installation, adjustment, and operation should be done only by personnel familiar with this type of equipment.

b. Setting Up of Transmitter.

(1) Bring a single Awg No. 14, or larger, insulated copper conductor from the nearest ground through one of the pipe nipples located on each side of the cabinet near the base, and connect it to the large ground stud (fig. 9).

(2) Connect a pair of Awg No. 14, or larger, insulated copper conductors to the nearest 115 volt, 60 cycle, a-c power supply. Install fuse and switch box so as to be able to disconnect power when servicing the transmitter. Run these wires through the other pipe nipple in the transmitter cabinet and connect to terminals 8 and 9 of the terminal strip on the transmitter base just inside the back door of the transmitter (fig. 9).

(3) Unpack the tubes carefully and place them firmly in their respective sockets. The sockets are identified by their markings, V1, V2, etc. (See figs. 10, 11, 39, 40, and 41.) A total of 16 tubes is used in Radio Transmitter BC-400-G, as follows:

V1	(VT-84)	(JAN-84)	V9	(VT-84)	(JAN-84)
V2	(VT-96)	(JAN-6N7)	V10	(VT-287)	(JAN-815)
V3	(VT-96)	(JAN-6N7)	V11	(VT-287)	(JAN-815)
V4	(VT-96)	(JAN-6N7)	V12	(VT-145)	(JAN-5Z3)
V5	(VT-96)	(JAN-6N7)	V13	(VT-145)	(JAN-5Z3)
V6	(VT-66)	(JAN-6F6)	V14	(VT-145)	(JAN-5Z3)
V7	(VT-115)	(JAN-6L6)	V15	(VT-145)	(JAN-5Z3)
V8	(VT-115)	(JAN-6L6)	V16	(VT-84)	(JAN-84)

(4) Carefully attach plate clips to the tubes V10 and V11 (VT-287) (fig. 10).

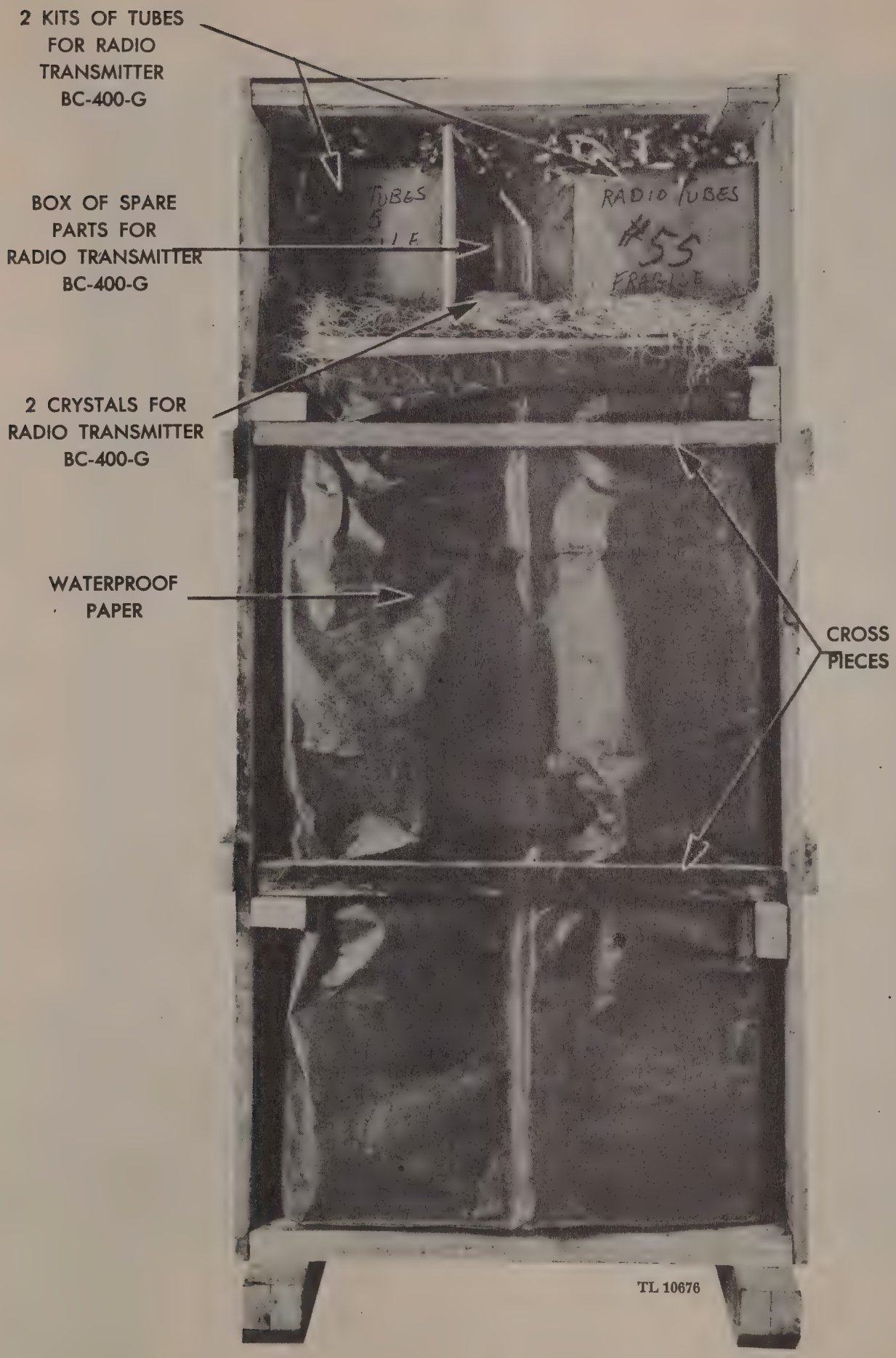


Figure 4. Transmitter packing case, cover removed.

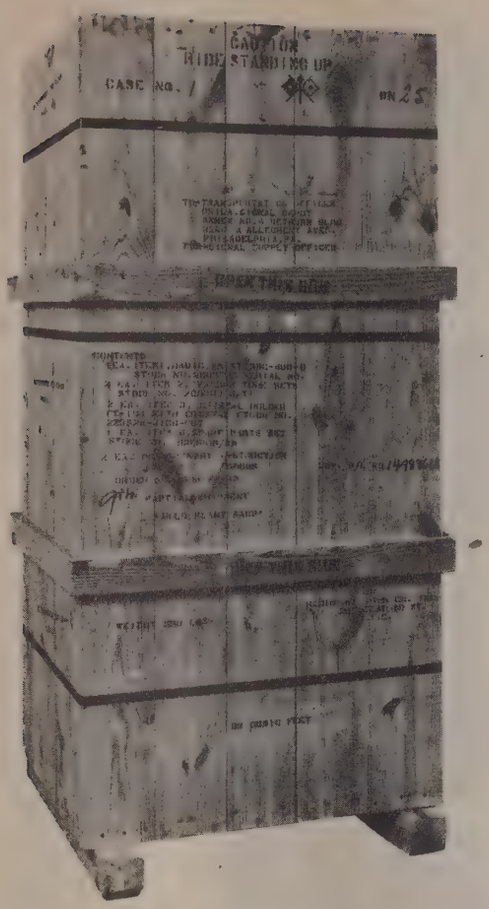


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Figure 5. Transmitter packing case.

(5) Insert the two crystal holders (containing 4166.667 kc crystals) into their clip receptacles on the radio-frequency unit (fig. 11).

c. Antenna Connection. Two feed-through insulators are on the top of the cabinet for antenna connections (fig. 9). Any impedance load between 100 and 600 ohms may be used.

CAUTION.—Do not apply power until all necessary adjustments and precautions detailed in paragraphs 10 and 11 have been observed.

9. REPACKING

a. Preparation for Casing. Remove all tubes from their sockets and place them in their kits. Using cotton tape, securely tie the following so as to prevent motion:

(1) The plate leads on V10 and V11 (fig. 10)

(2) The rotatable antenna coupling link L8

(3) The Navy Type D resistors

b. Casing. (1) Bolt the base of the transmitter to the wooden skid that forms the bottom of the packing case. Four clearance holes are provided in the base of the transmitter for this purpose (figs. 7 and 8). Bolt required is 3/16 inch screw head, and is applied with its screw head on under side of skid, and the nut on the transmitter cabinet floor side. Tighten bolt and nut with fingers as far as possible, then tilt cabinet carefully and tighten screw heads on under side of skid with screw driver.

CAUTION.—Placing bolts so that nuts are on under side of skid will interfere with handling skid on standard jack used for the purpose.

(2) Wrap the transmitter in a layer of felt wadding and waterproof paper.

(3) If case has been knocked down, assemble the back, two sides, and top, then place in position with the front of the transmitter facing the back of the case. Nail the assembly onto the skid.

(4) Place the spare parts box, the two tube kits, and the two crystal boxes (*securely wrapped against damage*) in the space above the transmitter, and pack excelsior between the kits and between the kits and bottom, top, and sides of the case, completely filling up this space.

(5) Nail on the wood cross pieces shown in figure 4, then nail on the front of the case, and apply three steel straps to bind the case.

c. Transporting. The case should be transported always in an upright position.

10. PREPARATION FOR USE

WARNING.—Radio Transmitter BC-400-G uses high voltage power supplies operating at such potentials as to endanger life. In handling this equipment, use your head. *Think, FIRST! Do not make adjustments inside the transmitter with the high voltage ON.* Do not rely on door interlock switches. Always disconnect input power line before opening the doors to service transmitter.

a. Check. Make a detailed inspection of the transmitter to assure the following conditions *before turning on power:*

(1) All tubes must be firmly in correct sockets.

(2) All plate caps must be firmly in place.

(3) All leads must be firmly attached. There must be no wires hanging loosely within the cabinet.

(4) All connections to the terminal strips must be orderly, so that no loose wires are touching other terminals.

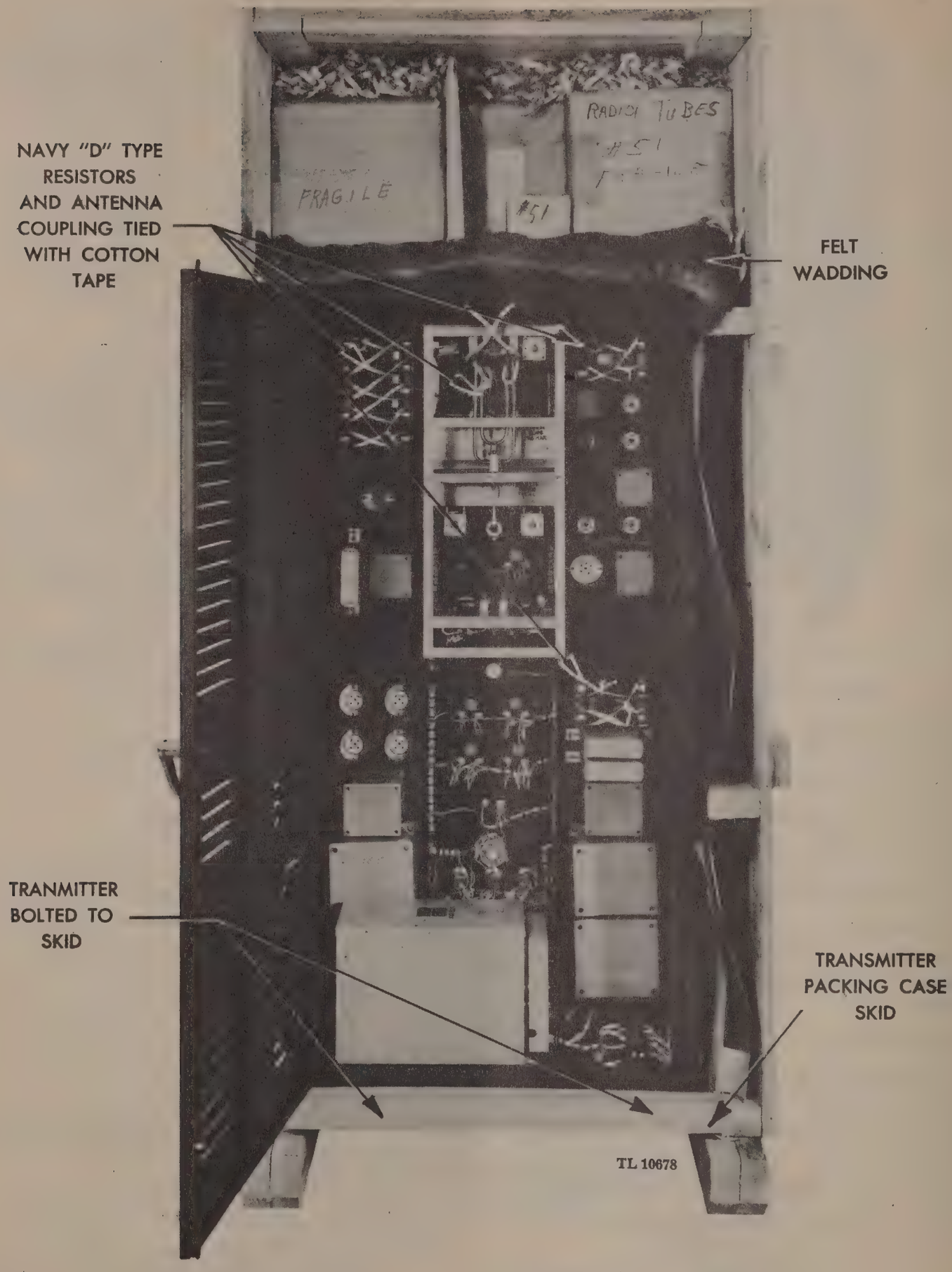


Figure 6. Transmitter in uncovered packing case, rear door open.

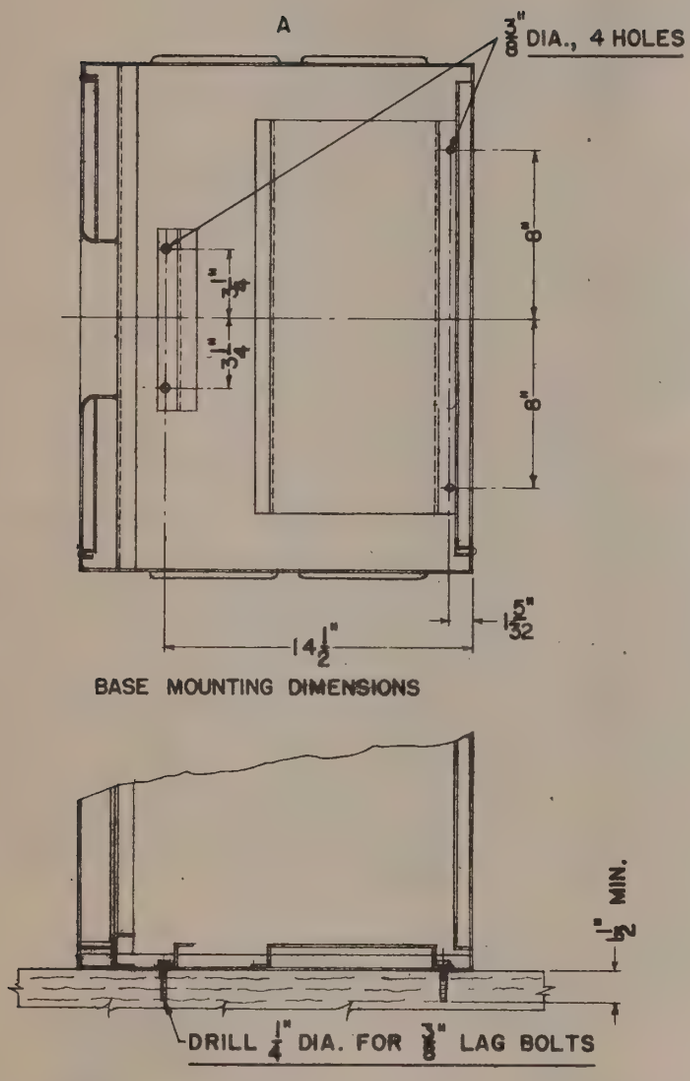


Figure 7. Radio Transmitter BC-400-G, installation diagram.

11. PRELIMINARY TUNING ADJUSTMENTS

a. Tuning Dials and Controls (Without Power).

(1) Set tuning dials as follows:

OSC. MULT. PLATE	2.5
2nd MULT. PLATE	5
3rd MULT. GRID	3.5
3rd MULT. PLATE	5
P.A. GRID	2
P.A. PLATE	5
COUPLING	0

(2) Set controls as follows:

PLATE VOLTAGE	Position 4
CRYSTAL SWITCH	1 or 2
MODULATION LEVEL	0
VOLTAGE REGULATOR SELECTOR SWITCH	IN

b. Further Adjustments (With Power).

(1) Turn the two A.C. LINE switches to ON. The white pilot lamp (left-hand side) will light, indicating that power is being supplied to the voltage regulator.

(2) Turn the TRANS. FIL. switch to ON. The green pilot lamp (middle) will light, indicating that the filaments are on, and if the doors of the transmitter are closed, the bias relay will be energized as soon as the rectifier tube reaches operating temperature. When the bias relay closes, it allows the plate circuit relay to be energized by the bias supply. When the plate circuit relay is closed, the primaries of the plate transformers may be turned on.

(3) Turn the TRANS. PLATE switch to ON. The red pilot lamp (right-hand side) will light, indicating that the plate transformer is on. With PLATE VOLTAGE control at maximum, or 4,

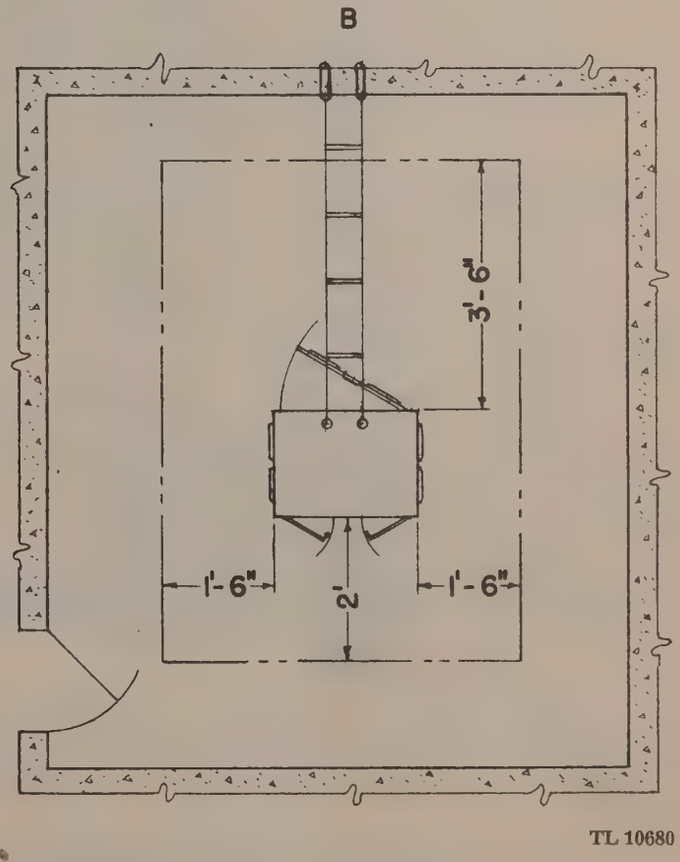


Figure 8. Radio Transmitter BC-400-G, installation diagram, suggested clearances.

the power supply voltmeters should indicate about as follows:

A.F. PLATE meter M2	300 volts
R.F. PLATE meter M3	400 volts

12. OPERATION

a. Preliminary Steps.

CAUTION.—Keep MOD. LEVEL at 0 until tuning operations are completed. At no time should the P.A. PLATE CURRENT exceed 80 MA. If the P.A. PLATE METER M11 reads high, resonate the circuit by tuning P.A. PLATE until meter dips.

(1) Slowly rotate OSC. MULT. PLATE dial to get dip in OSC. MULT. PLATE meter. This should occur at a dial setting of about 2.5, and the corresponding meter reading should be at about 12 ma. Leave the dial set at minimum plate current.

(2) Rotate the 2nd MULT. PLATE dial until the 2nd MULT. PLATE meter dips to minimum. This should occur at a dial setting of about 4, and the meter reading should be about 40 ma (this reading will drop to 28-34 ma as the transmitter is tuned as described below).

(3) Rotate the 3rd MULT. GRID dial for maximum grid current indication on the 3rd MULT. GRID meter M8. This should occur at a dial setting of about 3.5 and a meter reading of 3 ma.

(4) Rotate the 3rd MULT. PLATE dial for a minimum reading on the 3rd MULT. PLATE meter (about 6 on the dial, 60 ma on the meter).

(5) Rotate the P.A. GRID dial for maximum indication on the P.A. GRID meter (about 3 on the dial, 6.5 ma on the meter).

(6) Go back and retune the 3rd MULT. PLATE for minimum. The circuit may have been slightly detuned by the change in p-a grid loading. Also repeat operation (5) preceding.

(7) Rotate the P.A. PLATE dial for P.A. PLATE meter dip. (About 4 on the dial and 30 ma on the meter.)

(8) Load the P.A. PLATE by rotating the COUPLING dial from 0 toward 10, to 50 ma. The dial setting will depend on the antenna system used.

(9) Operate the MODULATION LEVEL control unit until the MODULATION indicator shows desired modulation level. (For accurate dial setting and meter readings, see tuning chart on left front door of the transmitter.) *Transmitter now should be tuned and operating.*

Note.—Switching the crystals should have only a small effect on meter readings.

b. Neutralizing (Figs. 10 and 41). Neutralizing adjustments have been made during manufacture. Only in extreme cases need the neutralization be adjusted. It can be done by loosening the nuts on the rods and sliding them up or down. They can be checked roughly by rotating the P.A. PLATE dial and observing the P.A. GRID meter. No sharp dips should be noticeable thereon, although the P.A. GRID current may change slightly.

c. 100 Percent Modulation. To check for 100 percent modulation, either of the two following methods may be used:

(1) Connect a negative peak indicator to terminals 13 and 18 of the audio unit (fig. 35).

(2) Connect a copper-oxide rectifier type a-c voltmeter across terminals 5 and 18 of the audio unit (fig. 35). Include capacitor in a-c meter circuit. Connect a d-c voltmeter from terminal 5 to ground on the same unit. When the a-c voltage is equal to 75 percent of the d-c voltage, the carrier is 100 percent modulated. This value takes into consideration the fact that the a-c meter reads 0.707 of the rms peak value. This method is not very accurate and is not advisable if a negative peak indicator is available.

13. METER READING LIMITS

(PLATE VOLTAGE switch on 4)

Meter		Milliamperes
OSC. MULT. PLATE	Crystal not oscillating	50–70
	Crystal oscillating	10–16
2nd MULT. PLATE		28–34
3rd MULT. GRID		2.8–4.6
3rd MULT. PLATE		54–70
P.A. GRID		5–8
P.A. PLATE		50
MOD. PLATE	0% modulation	70–90
	100% modulation	120–140
		Volts
A.F. PLATE		280–310
R.F. PLATE		380–410
A.C. LINE		114–118

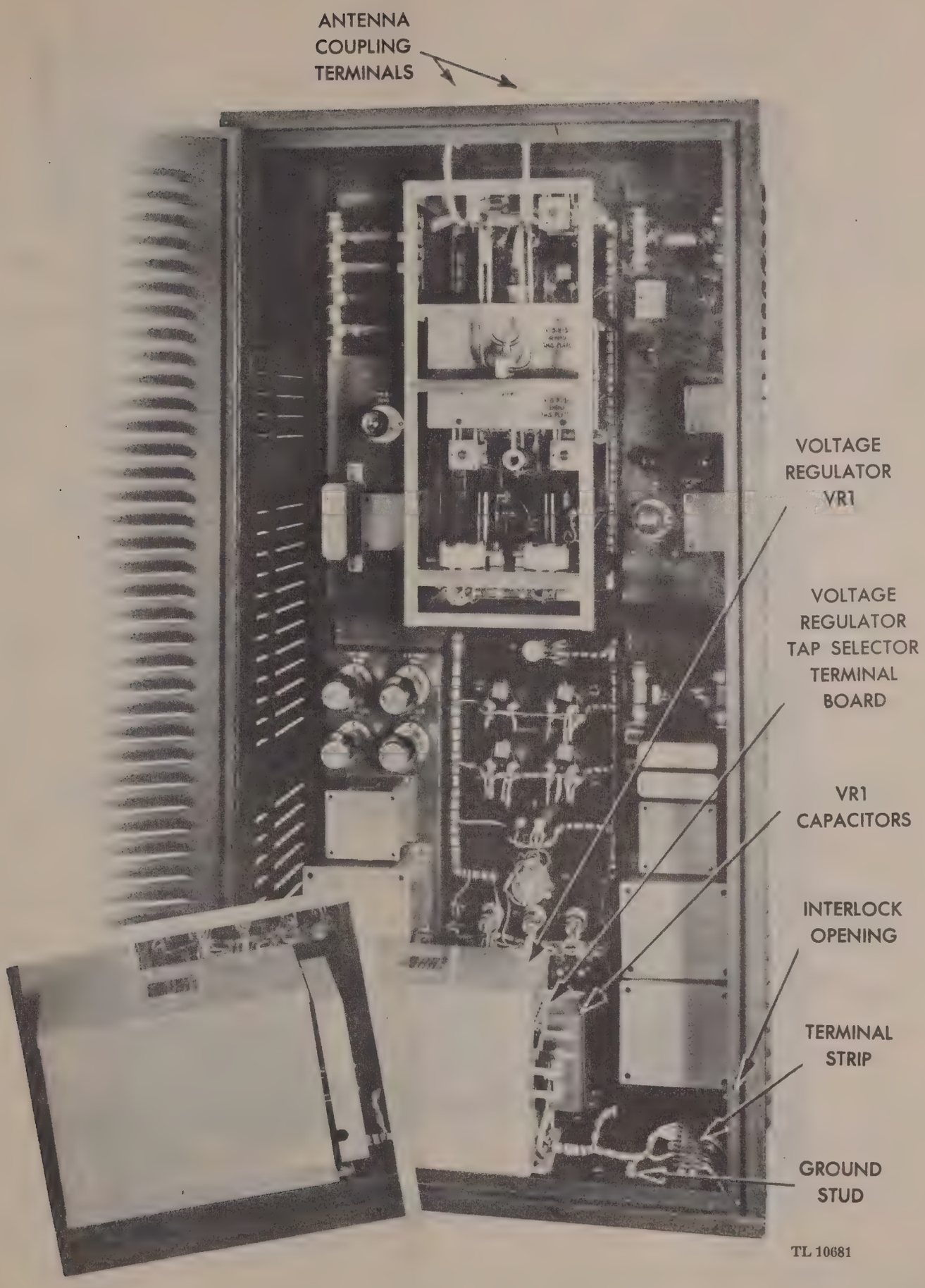


Figure 9. Radio Transmitter BC-400-G, rear view, voltage regulator cover removed. (Insert shows cover in place.)

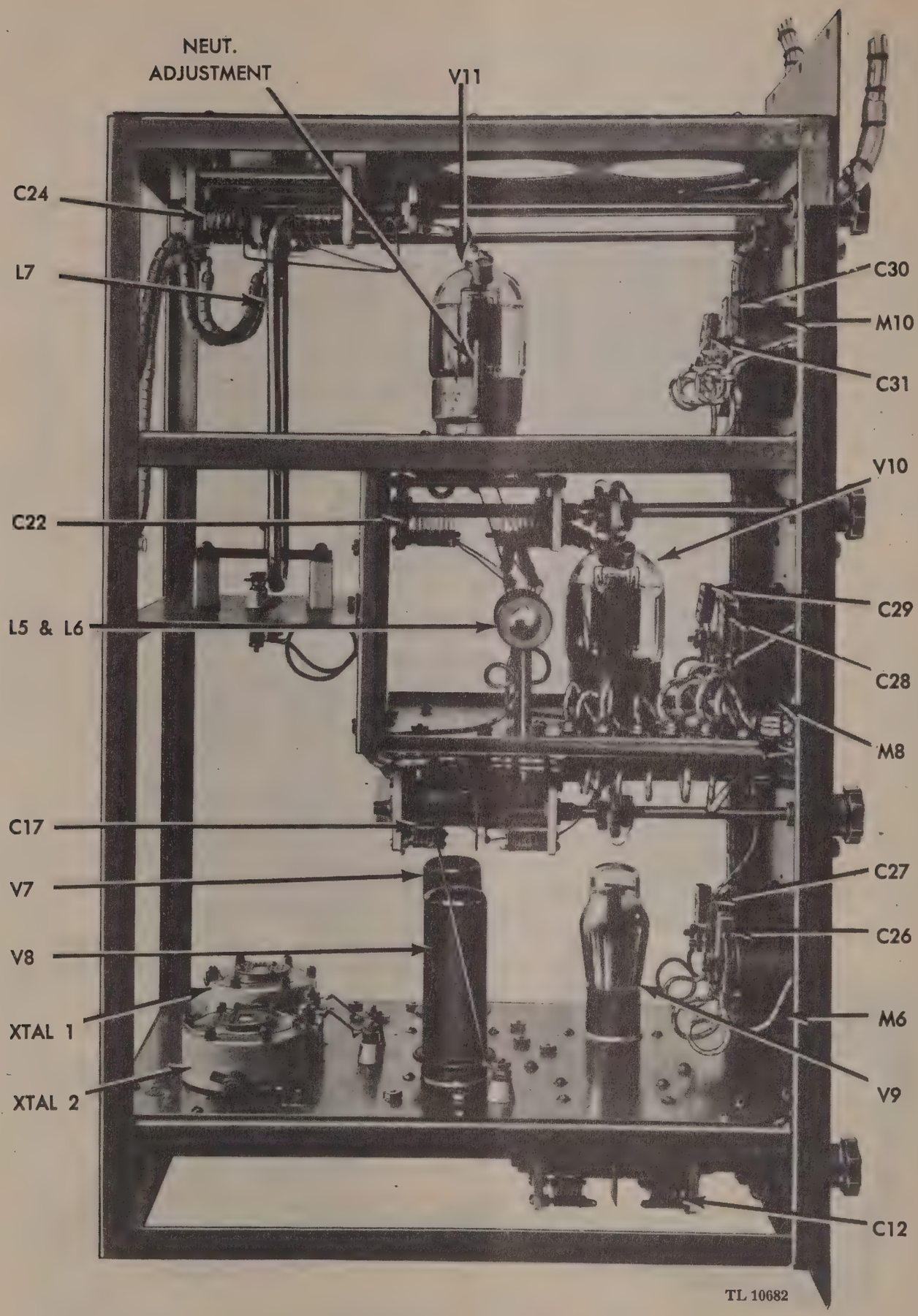


Figure 10. Radio-frequency unit, left-hand side.

Section III

FUNCTIONING OF PARTS

14. LOCATIONS OF TRANSMITTER COMPONENTS

a. Viewing from Front of Transmitter.

Name	Location
(1) R-f (radio-frequency) unit	Upper center
(2) Audio (audio-frequency) unit	Upper left
(3) Power filter unit	Lower left
(4) Power rectifier unit	Lower right
(5) Bias and relay unit	Upper right
(6) Control unit	Lower center

b. Inside the Housing (Fig. 9).

Name	Location
(1) Plate and filament voltage regulator VR1	Bottom
(2) Voltage regulator VR1 capacitors	Bottom
(3) Antenna coupling	Top

15. RADIO-FREQUENCY UNIT

a. General. The radio-frequency unit (figs. 10, 11, 12, 14, 41, 42, and 43) consists of a beam-power crystal oscillator-multiplier (doubler), a beam-power second multiplier (tripler), a twin beam-power third multiplier (tripler), a neutralized twin beam-power class C amplifier, and a radio-frequency output coupling. (*The bias-isolator circuit is also part of this unit.*)

b. Oscillator Multiplier. The crystal oscillator consists of a beam-power vacuum tube V7 (VT-115), and its associated components. The crystal frequency, 4166.667 kilocycles, is 1/18 of the desired carrier output frequency. Two crystals are provided for each transmitter and either may be selected through CRYSTAL SWITCH S6 mounted on the front panel. Oscillator-output frequency is double the crystal frequency, as the plate circuit is tuned to the second harmonic (8333.34 kilocycles) through capacitor C12 and coil L2.

c. Second Multiplier (Tripler). The output of the multiplier section of the oscillator-multiplier is capacity-coupled to the grid of the second multiplier V8 (VT-115). This tube acts as a beam-power tripler, having an output frequency of 25 megacycles (sixth harmonic) tuned through coil L3 and capacitor V17. (The oscillator-multiplier and second multiplier are mounted on a common chassis.)

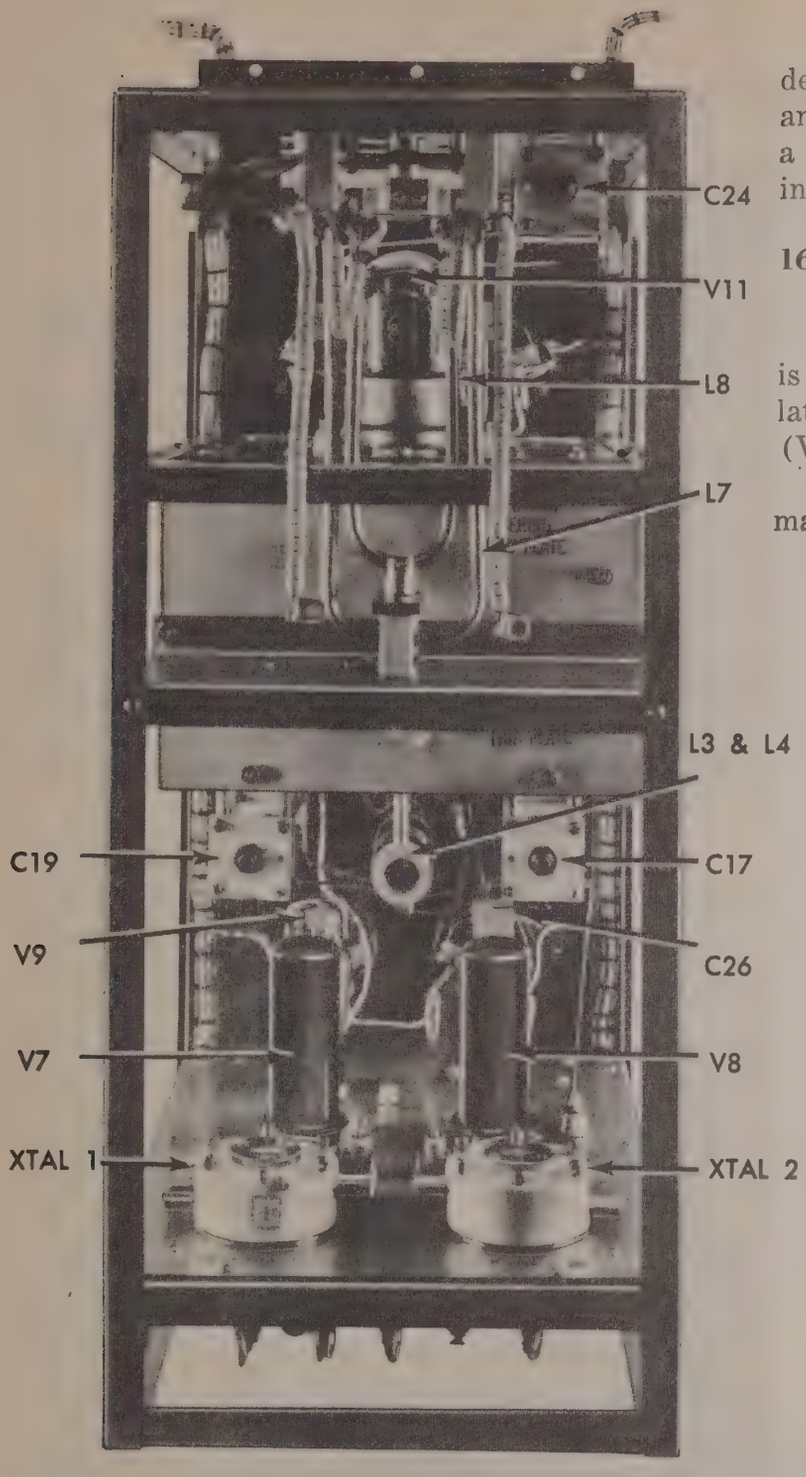
d. Third Multiplier (Tripler). The output of the second multiplier is inductively coupled to coil L4 and capacitor C19, resonant at 25 megacycles, applying excitation voltage to the grids of the third multiplier V10 (815) (VT-287). This tube acts as a push-pull beam-power tripler, output frequency of which is 75 megacycles (18th harmonic) tuned through coil L5 and capacitor C21.

e. Power Amplifier. The output of the third multiplier is inductively coupled to coil L6 and capacitor C22, resonant at 75 megacycles, applying excitation voltage to the grids of the power-amplifier tube V11 (815) (VT-287). This tube acts as a neutralized class C push-pull beam-power amplifier, both screen and plate modulated. The output circuit, tuned through coil L7 and capacitor C24, is inductively coupled to coil L8 which transfers power to the antenna transmission line.

f. Bias-Isolator Circuit. The purpose of the bias-isolator tube V9 (VT-84) is to apply starting bias to third multiplier tube V10 (815) (VT-287) and power-amplifier tube V11 (815) (VT-287) in conjunction with bias rectifier V16 (VT-84) when no excitation exists. It also prevents the bias supply from limiting the magnitude of the bias voltage when excitation is supplied. The manner of operation is as follows:

(1) Bias rectifier tube V16 (VT-84) produces a direct current which flows from ground through relay E1 and then through resistors R15 and R16 to bias-isolator tube V9 (VT-84) and thence through resistor R17 to transformer T8 center tap.

(2) The voltage drops produced in resistors R15 and R16 provide a bias voltage for tubes V10 and V11 (815) (VT-287). When excitation is applied to tubes V10 and V11 (815) (VT-287), grid current flows through resistors R15 and R16.



TL 10683

Figure 11. Radio-frequency unit, rear view.

(3) When the magnitude of that current is sufficient to neutralize the plate voltage on tube V9 (VT-84) which is supplied by the bias rectifier, tube V9 (VT-84) becomes nonconducting, and tubes V10 and V11 (815) (VT-287) are then biased solely by the grid leak bias developed in resistors R15 and R16.

g. Output Coupling. Output coupling coil L8 is inductively coupled to plate inductor L7. The coupling is continuously variable from 0 to 100 percent by means of the COUPLING control mounted on the front panel. The coupling coil will deliver 5 watts of unmodulated carrier power into any resistance load between 100 and 600 ohms or a radio-frequency transmission line terminating in the characteristic impedance of 144 ohms.

16. AUDIO-FREQUENCY UNIT

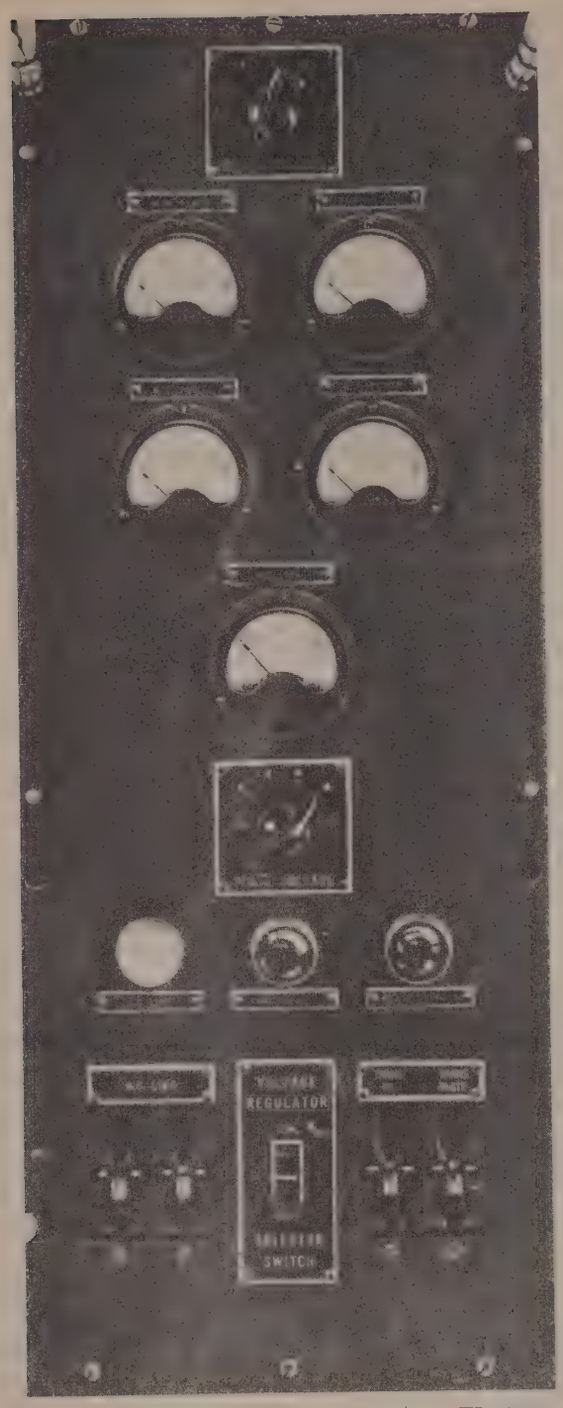
(Figs. 15, 16, 35, 39, and 43)

a. The modulation-tone frequency at 3,000 cps is produced by a triode vacuum tube audio oscillator, the main components of which are tube V6 (VT-66) and transformer T4.

b. Transformer T4 has three windings: a primary, a grid feed-back winding, and a center

TL 10684

Figure 12. Radio-frequency unit, front view.



TL 10685

Figure 13. Control unit, front view.

tapped output winding. The transformer is provided with an adjustment screw at the top by which the frequency of oscillation can be varied ± 200 cps. (The frequency is adjusted to 3,000 cps during manufacture and no further adjustment should be required.) The transformer secondary feeds voltage into the grids of tubes V4 and V5 (VT-96) which are push-pull parallel drivers controlled through MODULATION LEVEL control R10. In turn tubes V4 and V5 (VT-96) are transformer-coupled to the grids of tubes V2 and V3 (VT-96), push-pull parallel class B modulators. Percentage of modulation is indicated by meter M5 in conjunction with diode rectifier tube V1 (VT-84) and external multiplier R3. Calibration of the meter setting is accomplished through resistor R4, accessible by opening left front door.

17. A-C POWER SUPPLIES (Figs. 19, 20, 21 and 43)

Note.—A-c primary supplies will be described under paragraph 21, control circuits, since a-c power input depends upon control operation. There are two a-c secondary power supplies in the transmitter, described following.

a. High and Low Voltage Rectifier Filaments. Filament transformer T7, located on the power rectifier unit (figs. 17, 19, 36 and 43), supplies filament voltage for tubes V12, V13, V14, and V15 (VT-145), which are associated with plate and screen high voltage and plate low voltage transformers T5 and T6.

b. Radio-Frequency, Audio-Frequency, and Control Rectifier Tube Filaments. Filament transformer T1 supplies all filament current to radio-frequency and audio-frequency tubes, the bias rectifier tubes and modulation meter rectifier tubes. T1 is located on the power filter unit (figs. 22, 34, 38, and 43).

18. D-C POWER SUPPLIES (Fig. 43)

a. Radio-Frequency Unit Plate and Screen Voltage Rectifier. The high voltage radio-frequency unit plate and screen rectifier is one of the three d-c power supplies in the transmitter composed of transformer T5 and tubes V12 and V13 (VT-145) is located on the power rectifier unit (figs. 17, 20, 36, and 43). In conjunction with a filter system located on the power filter unit (figs. 34 and 38), the high voltage rectifier provides plate and screen voltages to the following tubes:

Oscillator-multiplier	V7 (VT-115)
Second multiplier	V8 (VT-116)
Third multiplier	V10 (815) (VT-287)
Power amplifier	V11 (815) (VT-287)

b. Radio-Frequency High Voltage Plate and Screen Supply. The radio-frequency unit high voltage plate supply is rated to deliver 400 volts d-c at any current up to 0.275 amp. PLATE VOLTAGE control switch S5, mounted on the front panel, provides reduction in output voltage to 300 v, 285 v, or 210 v in three steps and simultaneously reduces the output voltage of the audio unit low voltage plate supply proportionately. The radio-

frequency plate and screen supply is made up of the following components:

(1) *Located on the Power Rectifier Unit:*

Plate transformer	T5
Filament transformer	T7
Rectifier tubes	V12 and V13 (VT-145)

(2) *Located on the Power Filter Unit:*

Filter reactor	X1
Filter capacitor	C1
Bleeder resistor	R1

c. Audio-Frequency Unit Plate Voltage Rectifier. The audio-frequency unit low voltage plate rectifier, composed of transformer T6 and rectifier tubes V14 and V15 (VT-145) is located on the power rectifier unit. In conjunction with a filter system located on the power filter unit, the audio-frequency unit low voltage plate rectifier supplies plate voltage to the following tubes:

Audio oscillator	V6 (VT-66)
Drivers	V4 and V5 (VT-96)
Modulators	V2 and V3 (VT-96)

This supply is rated to deliver 300 volts d-c at any current up to 0.2 amp. PLATE VOLTAGE control switch S5, located on the front panel, is designed to reduce the output voltage to 275 v, 200 v, or 155 v, in three steps, and simultaneously reduces the output voltage of the radio-frequency unit plate and screen supply proportionately. The audio-frequency unit low voltage plate supply is made up of the following components:

(1) *Located on the Power Rectifier Unit:*

Plate transformer	T6
Filament transformer	T7
Rectifier tubes	V14 and V15 (VT-145)

(2) *Located on the Power Filter Unit:*

Filter reactor	X2
Filter capacitor	C2
Bleeder resistor	R2

19. BIAS AND RELAY UNIT

a. Supply. The bias and relay unit (figs. 27, 37, 40, and 43) supplies 50 volts of fixed bias for the grid of the second multiplier tube V8 (VT-115), third multiplier tube V10 (815) (VT-287), and power-amplifier tube V11 (815) (VT-287). In addition, it furnishes actuating voltage for the bias interlock relay E1 and plate relay E2. The bias supply is intended to limit the plate current and prevent oscillation of the second multiplier, third multiplier, and power-amplifier of the radio-frequency unit in case of a loss of excitation by failure of a preceding stage. The bias relay E1 operates with ground as positive with relation to center tap of bias rectifier plate transformer T8, diode current flowing from ground through relay E1, grid resistors R15 and R16, isolator tube V9 (VT-84), and returning through filter resistor R17. Relay E1, in turn, completes the circuit for plate relay E2 which works directly from bias rectifier tube V16 (VT-84).

b. Components. Components located on the bias and relay unit chassis are as follows:

Plate transformer	T8
Bias dropping resistor	R17
Plate and screen dropping resistors	R18, R19, R20, R21
Filter capacitor	C32
Bias interlock relay	E1
Plate relay	E2
Tube	V16 (VT-84)

20. VOLTAGE REGULATOR UNIT

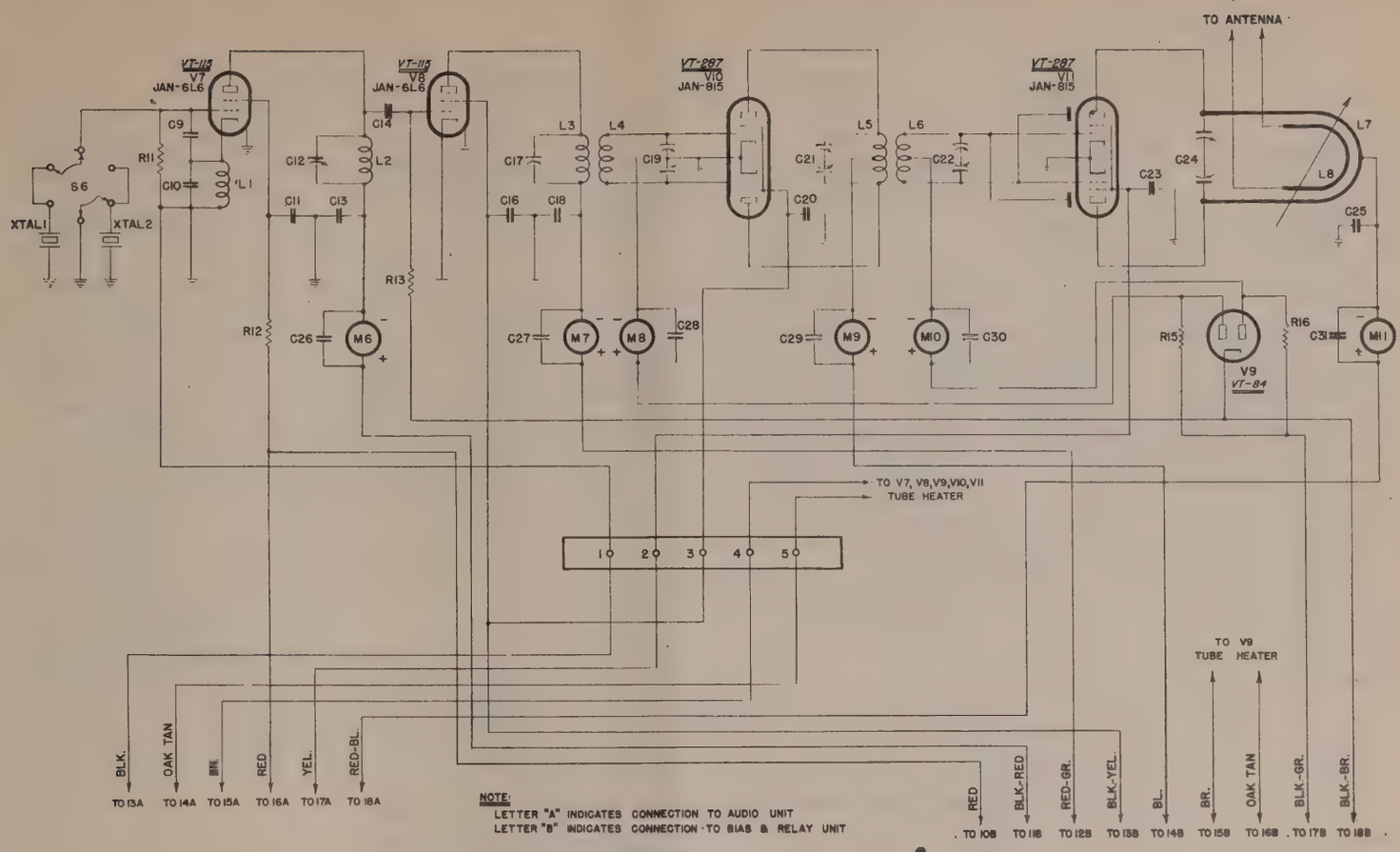
a. The voltage regulator unit VR1 (figs. 9, 28, and 43) mounted to the bottom of the transmitter cabinet, accessible with the rear door open, is a resonant winding type regulator. It is provided to maintain a constant 115 volt supply for all transformer primaries with a permissible input variation from 95 to 125 volts. The voltage regulator is rated at 400 volt amperes output.

b. In event of failure of the regulator unit VR1, it may be cut out of the circuit by operating the VOLTAGE REGULATOR switch S2 on the control unit front panel to OUT position.

21. CONTROL CIRCUITS

a. There are four electromagnetically actuated circuit breakers in the transmitter, located on the bottom of the control unit panel (figs. 13, 31, and 43), which are normally operated as manual switches. For the protection of personnel and equipment, these circuit breakers are designed to operate to OFF at dangerous currents. These circuit breakers, or switches, are:

CB1 A.C. LINE }
CB2 A.C. LINE } ..... A-c input
CB3 TRANS. FIL. ..... Filament and bias rectifier
CB4 TRANS. PLATE ..... High voltage



FUNCTIONS AND ELECTRICAL VALUES OF PARTS

TL 10696

CAPACITORS

- **C9** Oscillator-multiplier feed-back (22 mmfd, 500 v d-c working)
- **C10** Oscillator-multiplier cathode reactance (100 mmfd, 1,000 v d-c working)
- **C11** Oscillator-multiplier screen bypass (1,500 mmfd, 1,000 v d-c working)
- **C12** Oscillator-multiplier plate tuning (35 mmfd per section, dual, variable)
- **C13** Oscillator-multiplier plate bypass (1,500 mmfd, 1,000 v d-c working)
- **C14** 2nd multiplier grid coupling (22 mmfd, 500 v d-c working)
- **C16** 2nd multiplier screen bypass (1,500 mmfd, 1,000 v d-c working)
- **C17** 2nd multiplier plate tuning (35 mmfd per section, dual, variable)
- **C18** 2nd multiplier plate bypass (1,500 mmfd, 1,000 v d-c working)
- **C19** 3rd multiplier grid tuning (35 mmfd per section, dual, variable)
- **C20** 3rd multiplier screen bypass (1,500 mmfd, 1,000 v d-c working)
- **C21** 3rd multiplier plate tuning (3-15 mmfd per section, dual, variable)
- **C22** P-a grid tuning (3-15 mmfd per section, dual, variable)

CAPACITORS (cont'd)

- **C23** P-a screen bypass (1,500 mmfd, 1,000 v d-c working)
- **C24** P-a screen bypass (3-15 mmfd per section, dual, variable)
- **C25** P-a plate bypass (1,500 mmfd, 1,000 v d-c working)
- **C26** Meter M6 bypass (5,000 mmfd, 500 v d-c working)
- **C27** Meter M7 bypass (5,000 mmfd, 500 v d-c working)
- **C28** Meter M8 bypass (5,000 mmfd, 500 v d-c working)
- **C29** Meter M9 bypass (5,000 mmfd, 500 v d-c working)
- **C30** Meter M10 bypass (5,000 mmfd, 500 v d-c working)
- **C31** Meter M11 bypass (5,000 mmfd, 500 v d-c working)

COILS

- **L1** Oscillator-multiplier cathode choke (1 millihenry)
- **L2** Oscillator-multiplier plate tuning
- **L3** 2nd multiplier plate tuning
- **L4** 3rd multiplier grid tuning
- **L5** 3rd multiplier plate tuning
- **L6** P-a grid tuning
- **L7** P-a plate tuning
- **L8** Output coupling

CRYSTALS

- **XTAL1, XTAL2** Frequency control (4166.667 kc)

METERS

- **M6** Oscillator-multiplier plate current (0-100 ma d- c)
- **M7** 2nd multiplier plate current (0-100 ma d-c)
- **M8** 3rd multiplier grid current (0-100 ma d-c)
- **M9** 3rd multiplier plate current (0-100 ma d-c)
- **M10** P-a grid current (0-15 ma d-c)
- **M11** P-a plate current (0-150 ma d-c)

RESISTORS

- **R11** Oscillator-multiplier grid (200,000 ohms, 2 w)
- **R12** Oscillator-multiplier screen dropping (35,000 ohms, 3 w)
- **R13** 2nd multiplier grid (50,000 ohms, 2 w)
- **R15** 3rd multiplier grid (50,000 ohms, 2 w)
- **R16** P-a grid (20,000 ohms, 2 w)

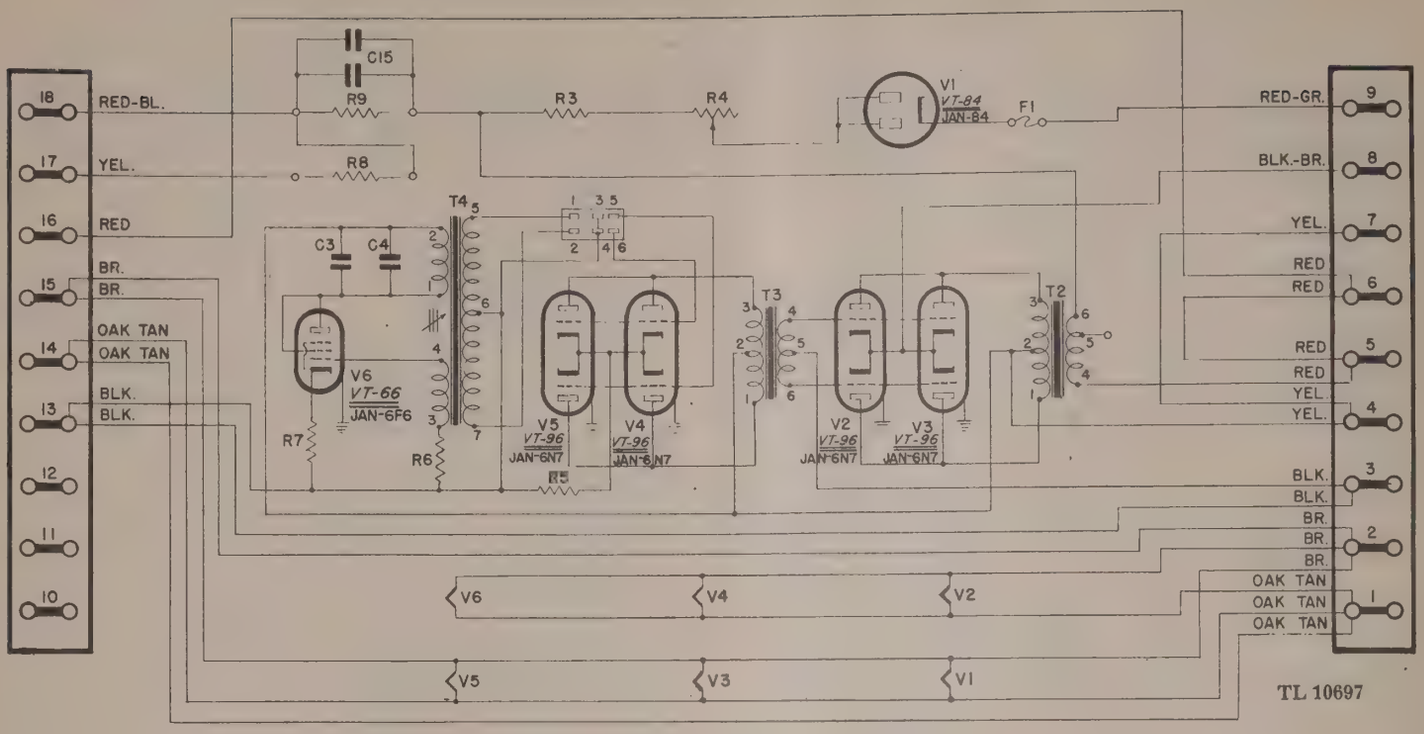
SWITCH

- **S6** Crystal selector

TUBES

- **V7** R-f oscillator multiplier
- **V8** 2nd multiplier
- **V9** Bias isolator
- **V10** 3rd multiplier
- **V11** Power amplifier

Figure 14. Radio-frequency unit, schematic diagram.



FUNCTIONS AND ELECTRICAL VALUES OF PARTS

CAPACITORS

C3	A-f oscillator tuning, matched pair (10,000 mmfd, 600 v d-c working)
C4	A-f oscillator tuning, matched pair (25,000 mmfd, 600 v d-c working)
C15	Resistor R9 a-f shunt (.01 mfd, dual, 1,000 v d-c working)

FUSE

F1	Meter M5 protection (1-100 amp)

POTENTIOMETER

R4	Modulation meter M5 calibration (150,000 ohms)

RESISTORS

R3	Meter M5 multiplier (50,000 ohms, 2 w)
R5	Audio driver cathode (500 ohms, 2 w)

RESISTORS (cont'd)

R6	Audio oscillator grid (1,000 ohms, 2 w)
R7	Audio oscillator cathode (3,000 ohms, 2 w)
R8	P-a screen dropping (10,000 ohms, 60 w)
R9	P-a plate dropping (1,500 ohms, 60 w)

TRANSFORMERS

T2	Modulation
T3	Audio driver
T4	Audio oscillator and output

TUBES

V1	Modulation meter rectifier
V2	Modulator
V3	Modulator
V4	Audio driver
V5	Audio driver
V6	Audio oscillator

Figure 15. Audio unit, schematic diagram.

FUNCTIONS AND ELECTRICAL VALUES OF PARTS

CAPACITORS

- C2 A-f power supply filter (10 mfd, 600 v d-c working)
- C3 A-f oscillator tuning, matched pair (10,000 mmfd, 600 v d-c working)
- C4 A-f oscillator tuning, matched pair (25,000 mmfd, 600 v d-c working)
- C5 Meter M2 bypass (5,000 mmfd, 500 v d-c working)
- C7 Meter M4 bypass (5,000 mmfd, 500 v d-c working)

METERS

- M2 A-f plate voltage (0-500 v d-c)
- M4 Modulation plate current (0-300 ma d-c)

POTENTIOMETER

- R10 Modulation level control (500,000 ohms, dual)

RESISTORS

- R2 R-f power supply bleeder (9,000 ohms, 60 w)
- R5 Audio driver cathode (500 ohms, 2 w)
- R6 Audio oscillator grid (1,000 ohms, 2 w)
- R7 Audio oscillator cathode (3,000 ohms, 2 w)

TRANSFORMERS

- T2 Modulation
- T3 Audio driver
- T4 Audio oscillator and output

TUBES

- V1 Modulation meter rectifier
- V2 Modulator
- V3 Modulator
- V4 Audio driver
- V5 Audio driver
- V6 Audio oscillator

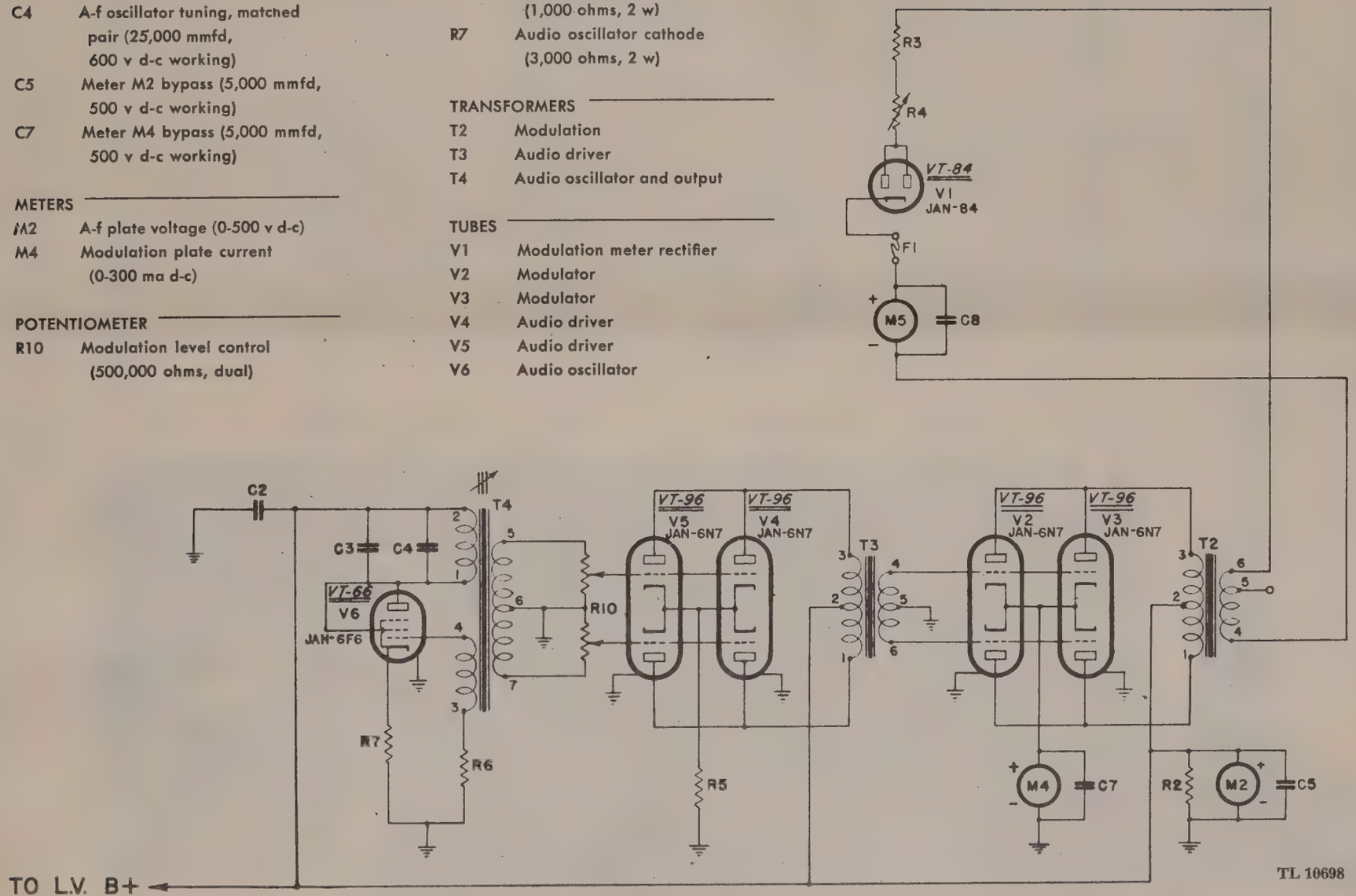


Figure 16.

Figure 16. Audio circuit, functional diagram.

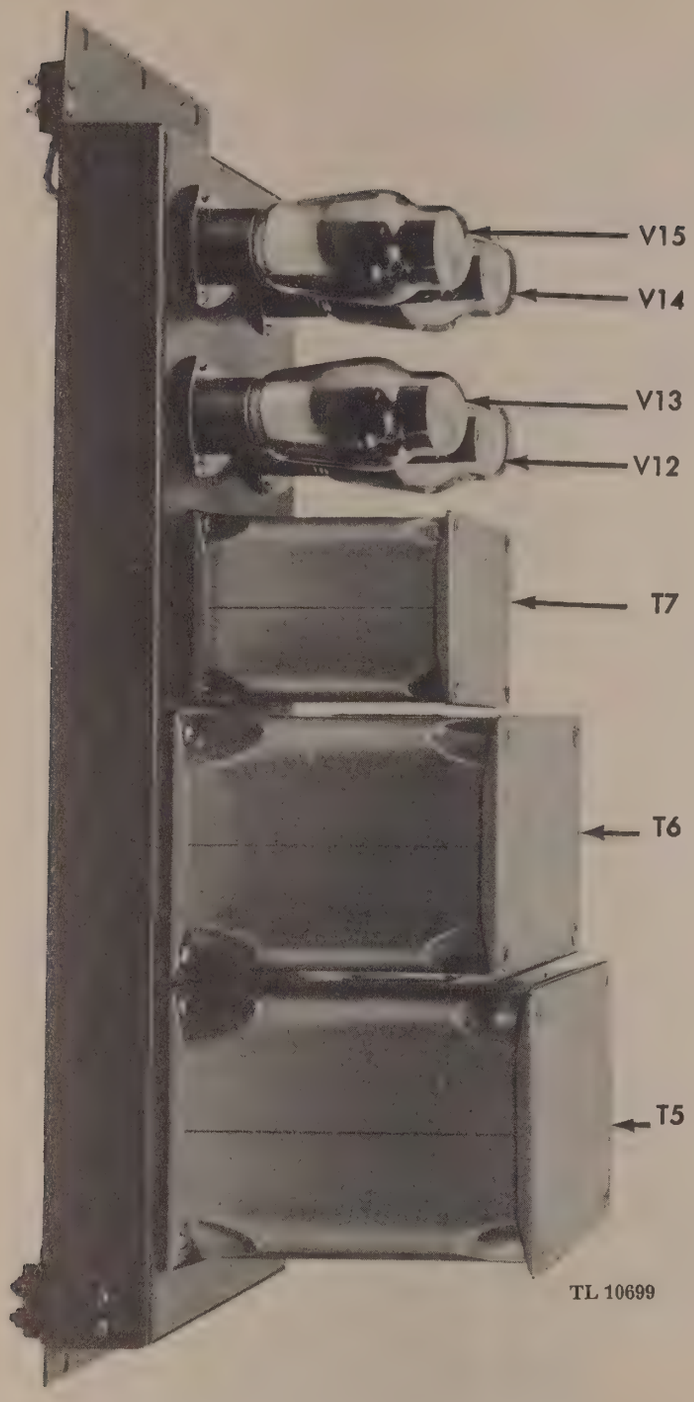


Figure 17. Power rectifier unit, rear view.

b. Operating the two A.C. LINE circuit breakers CB1 and CB2 to ON will illuminate white pilot lamp P1 on the front panel and voltage regulator VR1 will be energized.

c. Operating TRANS. FIL. circuit breaker CB3 to ON will illuminate green pilot lamp P2, energize primaries of transformers T1, T7, and T8, activate all filaments, and apply high voltage to the plates of bias rectifier tube V16 (VT-84).

Note.—At the center of the lower (control) panel is located the A.C. LINE voltmeter M1, which measures the input voltage to filament and plate transformers.

WARNING.—WHEN TRANS. PLATE CIRCUIT BREAKER CB4 IS OFF, TRANSFORMER T8 IS ENERGIZED AND HIGH VOLTAGE IS PRESENT ON THE PLATES OF BIAS RECTIFIER TUBE V16.

d. Turning TRANS. PLATE circuit breaker CB4 to ON will illuminate red pilot lamp P3 and apply secondary voltages to plate and screen rectifier tubes V12 and V13 (VT-145) and plate rectifier tubes V14 and V15 (VT-145), which will automatically bring the transmitter into operation.

e. The bias interlock relay E1 will automatically become energized, in turn activating plate relay E2, making the transmitter operative through TRANS. PLATE circuit breaker CB4. The power supply voltage indicators, A.F. PLATE voltmeter M2, and the R.F. PLATE voltmeter M3 should show readings of approximately 300 volts, and 400 volts respectively.

f. Opening either of the front doors or the rear door of the transmitter will operate safety interlock switches S1, S3, and/or S4, removing a-c line voltage to the bias rectifier transformer T8 primary, opening bias interlock relay E1 and plate relay E2, thus removing all plate voltages.

Section IV

MAINTENANCE

NOTE.—*Failure or unsatisfactory performance of this equipment will be reported immediately on W.D., A.G.O. Form No. 468. If form is not available, See TM 38-250.*

22. TEST SET

Signal Corps Test Set I-56-( ) is the proper equipment for testing Radio Transmitter BC-400-G.

23. ROUTINE INSPECTIONS AND TESTS

a. General. Regular checking of components of the transmitter and reading of the meters are necessary. Neglect will risk failure of the best of equipment. Some of the servicing functions are as follows:

b. Continuous Check. (1) Replace burned out pilot lamps (P1, P2, P3, interchangeable). These lamps are located in the receptacles on the control unit as follows: PR1 (white), left-hand; PR2 (green), middle; PR3 (red), right-hand.

(2) Replace any switch if there is evidence of poor contact or heating at the switch. Switches are as follows:

Rear door safety interlock switch SI, behind interlock opening (fig. 9)
Right front door safety interlock switch S4, (fig. 18)
Left front door safety interlock switch S3, (fig. 18)
Voltage regulator selector switch S2, (fig. 18)
Plate voltage control switch S5, (fig. 18)
Crystal selector switch S6, (fig. 42)

(3) Clean and adjust or replace relays E1 and E2 if they become sluggish in operation.

(4) Replace any tubes that indicate 20 percent less current than when first installed.

(5) If radio-frequency or audio-frequency voltmeters indicate 10 percent less voltage than normal, replace the rectifier tubes.

(6) Lubricate with petrolatum, U. S. Army Specification No. 2-67A, any capacitor bearings that exhibit unusual friction.

(7) Lubricate the panel bushings of r-f unit with petrolatum when required.

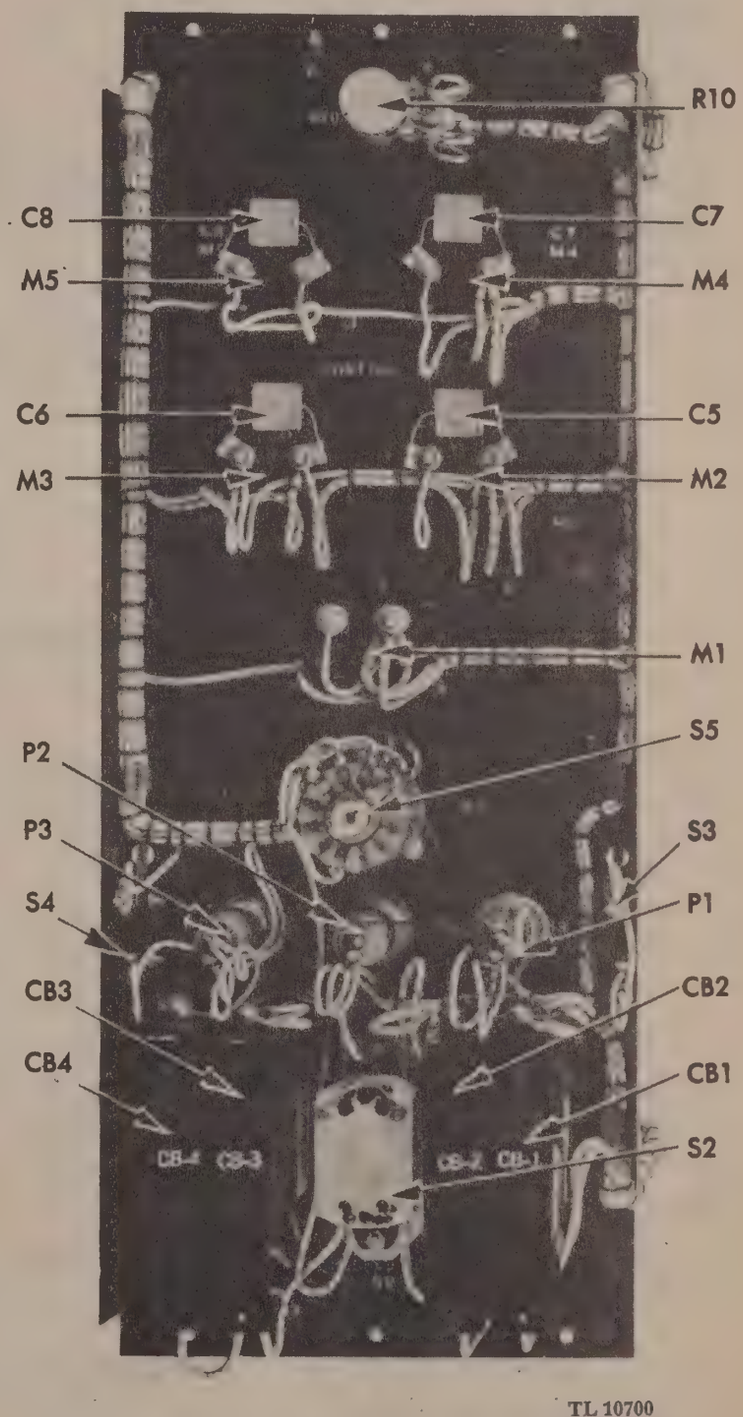
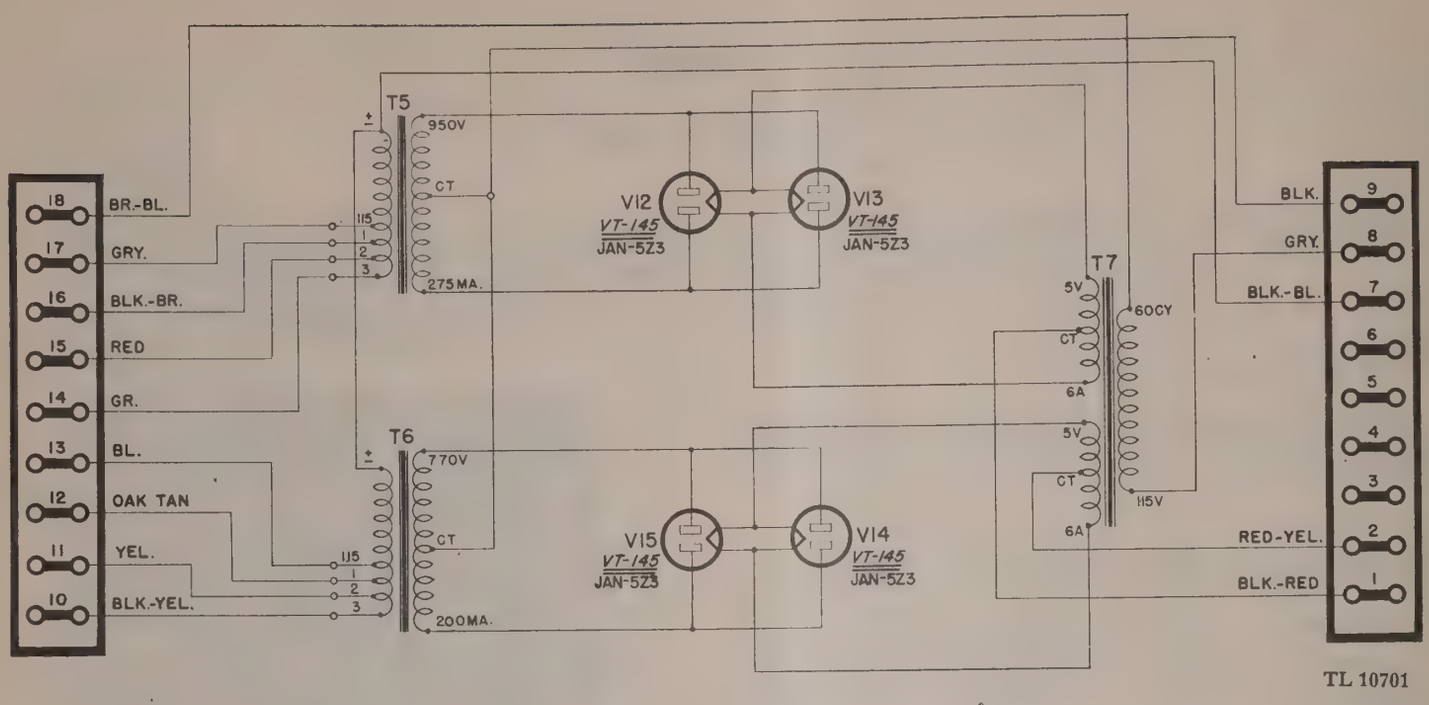


Figure 18. Control unit, rear view.



FUNCTIONS AND ELECTRICAL VALUES OF PARTS

TRANSFORMERS	
T5	R-f high voltage plate
T6	A-f high voltage plate
T7	High voltage rectifier filament

TUBES	
V12	R-f high voltage rectifier
V13	R-f high voltage rectifier
V14	A-f high voltage rectifier
V15	A-f high voltage rectifier

Figure 19. Power rectifier unit, schematic diagram.

(8) Clean the transmitter, when necessary, using a blower. Do not allow dust or other foreign matter to accumulate.

WARNING.—Do not permit the transmitter to operate if there is any evidence of corona discharge, sparking, unusual noise or vibration, or any overheating evidenced by smoke or smell.

c. Periodic Check. Every 1,000 hours of operation, examine relays and relay contacts; examine transformers and resistors for overheating; make a routine mechanical check; clean the transmitter.

d. Test Data. Test data is set forth in tables under paragraphs 25, 26, 27, 28, and 29.

24. ACCESS TO UNITS FOR SERVICING

a. Radio-Frequency Unit.

(1) Disconnect cabling from top terminal strips.
(2) Disconnect output leads from antenna binding posts.
(3) Remove mounting screws.
(4) Remove unit from transmitter for servicing.

b. Bias and Relay Unit, Power Rectifier Unit, Power Filter Unit, or Audio Unit.

(1) Disconnect cabling from terminal strips.
(2) Remove mounting screws.
(3) Remove unit from transmitter for servicing.

c. Control Unit.

(1) Disconnect cable from terminal strip.
(2) Disconnect plug from audio unit.
(3) Remove mounting screws.
(4) Remove unit from transmitter for servicing.

d. Voltage Regulator.

(1) Disconnect wiring.
(2) Remove holding screws.
(3) Remove regulator from transmitter for repair or replacement.

25. TUBE OPERATING VOLTAGES

Measured with 1,000 ohms-per-volt meter on appropriate scale. All readings are d-c unless otherwise specified.

Symbol	Tube Type	Element	+ Prod	— Prod	Voltage
V1	VT-84	Cathode	pin 4	gnd	400
V1	VT-84	Plates	pins 2, 3	gnd	250 †
V2, V3	VT-96	Plates	pins 3, 6	gnd	300
V2, V3	VT-96	Cathode	pin 8	gnd	0
V2, V3	VT-96	Grids	pins 4, 5	gnd	0
V4, V5	VT-96	Plates	pins 3, 6	gnd	300
V4, V5	VT-96	Cathode	pin 8	gnd	7
V4, V5	VT-96	Grids	pins 4, 5	gnd	0
V6	VT-66	Plate and screen	pins 3, 4	gnd	300 Screen
V6	VT-66	Cathode	pin 8	gnd	45
V6	VT-66	Control grid	gnd	pin 5	3 †
V6	VT-66	Blank socket terminal	pin 6	gnd	300
V7	VT-115	Plate	R18 §	gnd	300
V7	VT-115	Screen grid	R12 §	gnd	200
V7	VT-115	Control grid	gnd	R11	95 *
V7	VT-115	Cathode	L1	gnd	0.2
V8	VT-115	Plate	R19 §	gnd	280
V8	VT-115	Screen grid	R20 §	gnd	160
V8	VT-115	Control grid	gnd	R13 ¶	180
V8	VT-115	Cathode	pin 8	gnd	0
V9	VT-84	Cathode	gnd	R17 §	53
V9	VT-84	Plate	gnd	pin 2	180
V9	VT-84	Plate	gnd	pin 3	125
V10	VT-287 (815)	Plate	R21 §	gnd	210
V10	VT-287 (815)	Screen grid	R20 §	gnd	160
V10	VT-287 (815)	Bias	gnd	R15 §	180
V10	VT-287 (815)	Cathode	pins 3, 6	gnd	0
V11	VT-287 (815)	Plate	R9 §	gnd	285
V11	VT-287 (815)	Screen grid	R8 §	gnd	85
V11	VT-287 (815)	Bias	gnd	R16 §	125
V11	VT-287 (815)	Cathode	pins 3, 6	gnd	0
V12, V13	VT-145	Plates	pins 2, 3	gnd	540 a-c
V12, V13	VT-145	Filaments	pins 1 or 4	gnd	400 d-c
V14, V15	VT-145	Plates	pins 2, 3	gnd	420 a-c
V14, V15	VT-145	Filaments	pins 1 or 4	gnd	300 d-c
V16	VT-84	Cathode	pin 4	gnd	0
V16	VT-84	Plates	gnd	pins 2, 3	440 d-c

Note.—Filaments for tubes V12, V13, V14, V15 should be 5 volts a-c ±5 percent. All remaining tube filaments should be 6.3 volts a-c ±5 percent.

* Indicates an r-f choke in series with hot lead wire to prevent undue circuit disturbances, such as parasitics.
§ Low side: the least meter reading of the two ends of the resistor mentioned.
† Approximately.
¶ High side.

26. TRANSFORMER VOLTAGES

Transmitters on, 100 percent modulation.

Symbol	Function	Lugs	Voltage a-c
T1	Filament supply	PRIMARY	115
		SECONDARY	6.3
T2	Modulation	1-2, 2-3	110*
		1-3	220*
		4-6	240*
T3	A-f driver	1-3	70*
		4-6	35*
T4	A-f oscillator	1-2	140*
		3-4	140*
		5-7	45*
T5	R-f plate supply	PRIMARY	115
		SECONDARY	540-0-540
T6	A-f plate supply	PRIMARY	115
		SECONDARY	420-0-420
T7	R-f and a-f rectifier filaments	PRIMARY	115
		2 SECONDARIES	5
T8	Bias plate transformer	PRIMARY	115
		SECONDARY	460-0-460

* Indicates 3,000 cycle audio voltage. Readings are approximate.

27. MEASURED D-C VOLTAGES ACROSS RESISTOR TERMINALS

Use 1,000 ohms-per-volt meter.

Symbol	Function	Chassis Location	Voltage
R1	R-f supply bleeder	Power filter	400
R2	A-f supply bleeder	Power filter	300
R3	Modulation meter multiplier	Audio-frequency	17¶†
R4	Modulation meter calibrating	Audio-frequency	50¶†
R5	A-f driver cathode	Audio-frequency	7
R6	A-f oscillator grid	Audio-frequency	5†
R7	A-f oscillator cathode	Audio-frequency	47
R8	P-a screen dropping	Bias and relay	180
R9	P-a plate dropping	Bias and relay	100
R10	Modulation level control	Control unit	0
R11	Oscillator-multiplier grid	Radio-frequency	60†
R12	Oscillator-multiplier screen	Radio-frequency	170**
R13	2nd multiplier grid	Radio-frequency	85**
R14	NOT USED		
R15	3rd multiplier grid	Radio-frequency	170
R16	P-a grid	Radio-frequency	125
R17	Bias dropping	Bias and relay	360

27. MEASURED D-C VOLTAGES ACROSS RESISTOR TERMINALS (cont'd)

Use 1,000 ohms-per-volt meter.

Symbol	Function	Chassis Location	Voltage
R18	Oscillator multiplier plate dropping	Bias and relay	100
R19	2nd multiplier plate dropping	Bias and relay	110
R20	2nd and 3rd multiplier screen dropping	Bias and relay	220
R21	3rd multiplier plate dropping	Bias and relay	175

¶ 100 percent modulation.
** Use r-f choke in series with hot lead.
† Approximately.

28. MEASURED D-C VOLTAGES ACROSS CAPACITOR TERMINALS

Use 1,000 ohms-per-volt meter.

Symbol	Function	Voltage d-c
C1	R-f supply filter	400
C2	A-f supply filter	300
C3, C4	A-f oscillator tuning	0†§
C5	A-f plate meter bypass	300
C6	R-f plate meter bypass	400
C7	Modulation plate meter bypass	0
C8	Modulation meter bypass	0
C9	Oscillator-multiplier feed-back	95#†
C10	Oscillator-multiplier cathode tuning	0
C11	Oscillator-multiplier screen bypass	200
C12	Oscillator-multiplier plate tuning	0
C13	Oscillator-multiplier plate bypass	290
C14	2nd multiplier grid	‡
C15	Audio shunt	110
C16	2nd multiplier screen bypass	160
C17	2nd multiplier plate tuning	0
C18	2nd multiplier plate bypass	280
C19	3rd multiplier grid tuning	180#
C20	3rd multiplier screen bypass	160
C21	3rd multiplier plate tuning	0
C22	P-a grid tuning	0
C23	P-a screen bypass	85
C24	P-a plate tuning	0
C25	P-a plate bypass	285
C26	Oscillator-multiplier meter bypass	0
C27	2nd multiplier plate meter bypass	0
C28	3rd multiplier grid meter bypass	0
C29	3rd multiplier plate meter bypass	0
C30	P-a grid meter bypass	0
C31	P-a plate meter bypass	0
C32	Bias filter	53

Use r-f in series with hot lead.
† Approximately.
§ Approximately 45 v a-c.
‡ Not accurately measurable.

(*Turn to page 50*)

CAPACITORS

C1	R-f pa (10 n
C6	Meter 500 v
C11	Oscill bypa d-c v
C13	Oscill (1,50 work
C15	Resist dual
C16	2nd n (1,50 work
C18	2nd n (1,50 work
C20	3rd m (1,50 work
C23	P-a sc 1,00
C24	P-a sc per
C25	P-a pl 1,00
C26	Meter 500
C27	Meter 500
C29	Meter 500
C31	Meter 500

COND

VR1	Part c

CIRCUIT BREA

CB1	A-c li
CB2	A-c li
CB3	Filam (1.6
CB4	Plate

COILS

L1	Oscill chok
L2	Oscill
L3	2nd m
L4	3rd m
L5	3rd m
L6	P-a gr
L7	P-a pl
X1	R-f hi (12 h

METERS

M1	A-c li
M3	R-f p

26. TRANSFORMER VOLTAGES

Transmitters on, 100 percent modulation.

Symbol	Function	Lugs	Voltage a-c
T1	Filament supply	PRIMARY	115
		SECONDARY	6.3
T2	Modulation	1-2, 2-3	110*
		1-3	220*
		4-6	240*
T3	A-f driver	1-3	70*
		4-6	35*
T4	A-f oscillator	1-2	140*
		3-4	140*
		5-7	45*
T5	R-f plate supply	PRIMARY	115
		SECONDARY	540-0-540
T6	A-f plate supply	PRIMARY	115
		SECONDARY	420-0-420
T7	R-f and a-f rectifier filaments	PRIMARY	115
		2 SECONDARIES	5
T8	Bias plate transformer	PRIMARY	115
		SECONDARY	460-0-460

* Indicates 3,000 cycle audio voltage. Readings are approximate.

27. MEASURED D-C VOLTAGES ACROSS RESISTOR TERMINALS

Use 1,000 ohms-per-volt meter.

Symbol	Function	Chassis Location	Voltage
R1	R-f supply bleeder	Power filter	400
R2	A-f supply bleeder	Power filter	300
R3	Modulation meter multiplier	Audio-frequency	17¶†
R4	Modulation meter calibrating	Audio-frequency	50¶†
R5	A-f driver cathode	Audio-frequency	7
R6	A-f oscillator grid	Audio-frequency	5†
R7	A-f oscillator cathode	Audio-frequency	47
R8	P-a screen dropping	Bias and relay	180
R9	P-a plate dropping	Bias and relay	100
R10	Modulation level control	Control unit	0
R11	Oscillator-multiplier grid	Radio-frequency	60†
R12	Oscillator-multiplier screen	Radio-frequency	170**
R13	2nd multiplier grid	Radio-frequency	85**
R14	NOT USED		
R15	3rd multiplier grid	Radio-frequency	170
R16	P-a grid	Radio-frequency	125
R17	Bias dropping	Bias and relay	360

27. MEASURED D-C VOLTAGES ACROSS RESISTOR TERMINALS (cont'd)

Use 1,000 ohms-per-volt meter.

Symbol	Function	Chassis Location	Voltage
R18	Oscillator multiplier plate dropping	Bias and relay	100
R19	2nd multiplier plate dropping	Bias and relay	110
R20	2nd and 3rd multiplier screen dropping	Bias and relay	220
R21	3rd multiplier plate dropping	Bias and relay	175

¶ 100 percent modulation.
** Use r-f choke in series with hot lead.
† Approximately.

28. MEASURED D-C VOLTAGES ACROSS CAPACITOR TERMINALS

Use 1,000 ohms-per-volt meter.

Symbol	Function	Voltage d-c
C1	R-f supply filter	400
C2	A-f supply filter	300
C3, C4	A-f oscillator tuning	0†§
C5	A-f plate meter bypass	300
C6	R-f plate meter bypass	400
C7	Modulation plate meter bypass	0
C8	Modulation meter bypass	0
C9	Oscillator-multiplier feed-back	95#†
C10	Oscillator-multiplier cathode tuning	0
C11	Oscillator-multiplier screen bypass	200
C12	Oscillator-multiplier plate tuning	0
C13	Oscillator-multiplier plate bypass	290
C14	2nd multiplier grid	‡
C15	Audio shunt	110
C16	2nd multiplier screen bypass	160
C17	2nd multiplier plate tuning	0
C18	2nd multiplier plate bypass	280
C19	3rd multiplier grid tuning	180#
C20	3rd multiplier screen bypass	160
C21	3rd multiplier plate tuning	0
C22	P-a grid tuning	0
C23	P-a screen bypass	85
C24	P-a plate tuning	0
C25	P-a plate bypass	285
C26	Oscillator-multiplier meter bypass	0
C27	2nd multiplier plate meter bypass	0
C28	3rd multiplier grid meter bypass	0
C29	3rd multiplier plate meter bypass	0
C30	P-a grid meter bypass	0
C31	P-a plate meter bypass	0
C32	Bias filter	53

Use r-f-in series with hot lead.
† Approximately.
§ Approximately 45 v a-c.
‡ Not accurately measurable.

(*Turn to page 50*)

FUNCTIONS AND ELECTRICAL VALUES OF PARTS

CAPACITORS

C1	R-f power supply filter (10 mfd, 600 v d-c working)
C6	Meter M3 bypass (5,000 mmfd, 500 v d-c working)
C11	Oscillator-multiplier screen bypass (1,500 mmfd, 1,000 v d-c working)
C13	Oscillator-multiplier plate bypass (1,500 mmfd, 1,000 v d-c working)
C15	Resistor R9 a-f shunt (0.1 mfd, dual 1,000 v d-c working)
C16	2nd multiplier screen bypass (1,500 mmfd, 1,000 v d-c working)
C18	2nd multiplier plate bypass (1,500 mmfd, 1,000 v d-c working)
C20	3rd multiplier screen bypass (1,500 mmfd, 1,000 v d-c working)
C23	P-a screen bypass (1,500 mmfd, 1,000 v d-c working)
C24	P-a screen bypass (3-15 mmfd per section, dual, variable)
C25	P-a plate bypass (1,500 mmfd, 1,000 v d-c working)
C26	Meter M6 bypass (5,000 mmfd, 500 v d-c working)
C27	Meter M7 bypass (5,000 mmfd, 500 v d-c working)
C29	Meter M9 bypass (5,000 mmfd, 500 v d-c working)
C31	Meter M11 bypass (5,000 mmfd, 500 v d-c working)

COND

VR1	Part of voltage regulator VR1

CIRCUIT BREAKERS

CB1	A-c line (4.6 amp, 120 v)
CB2	A-c line (4.6 amp, 120 v)
CB3	Filament and bias supply (1.6 amp, 120 v)
CB4	Plate overload (2.6 amp, 120 v)

COILS

L1	Oscillator-multiplier cathode choke (1 millihenry)
L2	Oscillator-multiplier plate tuning
L3	2nd multiplier plate tuning
L4	3rd multiplier grid tuning
L5	3rd multiplier plate tuning
L6	P-a grid tuning
L7	P-a plate tuning
X1	R-f high voltage filter (12 h)

METERS

M1	A-c line voltage (0-150 v a-c)
M3	R-f plate voltage (0-500 v a-c)

METERS (cont'd)

M6	Oscillator-multiplier plate current (0-100 ma d-c)
M7	2nd multiplier plate current (0-100 ma d-c)
M9	3rd multiplier plate current (0-100 ma d-c)
M11	P-a current (0-150 ma d-c)

RECEPTACLES

P1	A-c line pilot
P2	Filament pilot

RELAYS

E1	Bias interlock control
E2	Bias interlock plate

RESISTORS

R1	R-f power supply bleeder (9,400 ohms, 60 w)
R8	P-a screen dropping (10,000 ohms, 60 w)
R9	P-a plate dropping (1,500 ohms, 60 w)
R12	Oscillator-multiplier screen dropping (35,000 ohms, 3 w)
R15	3rd multiplier grid (50,000 ohms, 2 w)
R16	P-a grid (20,000 ohms, 2 w)
R18	Oscillator-multiplier plate dropping (5,000 ohms, 60 w)
R19	2nd multiplier plate dropping (3,000 ohms, 60 w)
R20	2nd and 3rd multiplier screen dropping (17,500 ohms, 60 w)
R21	3rd multiplier plate dropping (2,500 ohms, 60 w)

TRANSFORMERS

T2	Modulation
T5	R-f high voltage plate
T7	High voltage rectifier filament
T8	Bias rectifier plate

TUBES

V7	R-f oscillator-multiplier
V8	2nd multiplier
V9	Bias isolator
V10	3rd multiplier
V11	Power amplifier
V12	R-f high voltage rectifier
V13	R-f high voltage rectifier
V16	Bias rectifier

SWITCHES

S1	Rear door safety interlock
S2	Voltage regulator selector
S3	Front left door safety interlock
S4	Front right door safety interlock
S5	Plate voltage control

VOLTAGE REGULATOR

VR1	A-c line

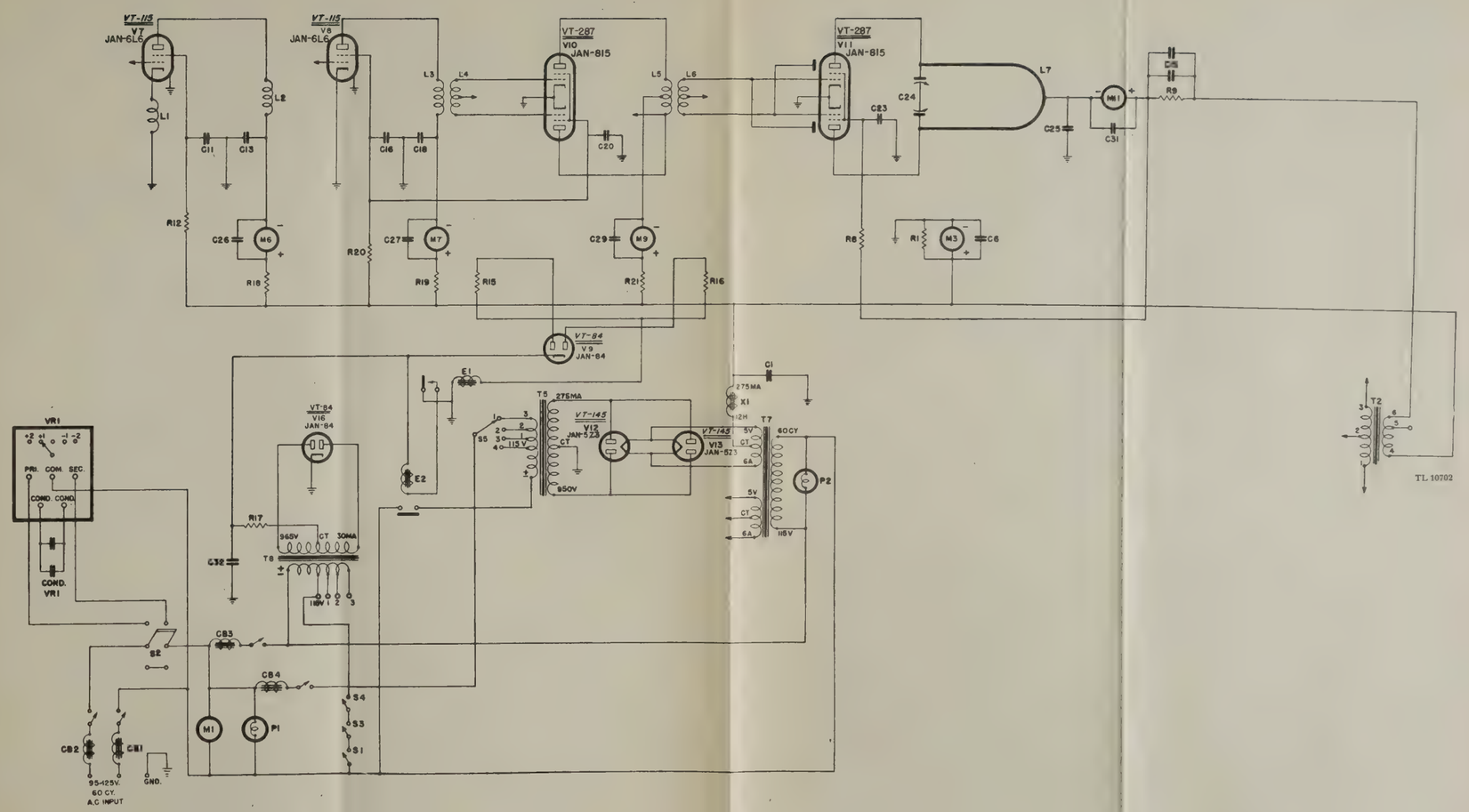


Figure 20. High voltage functional diagram.

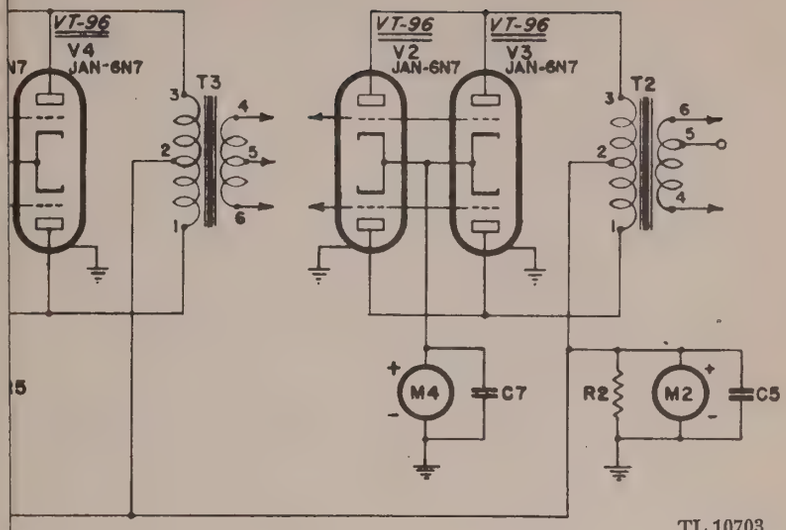
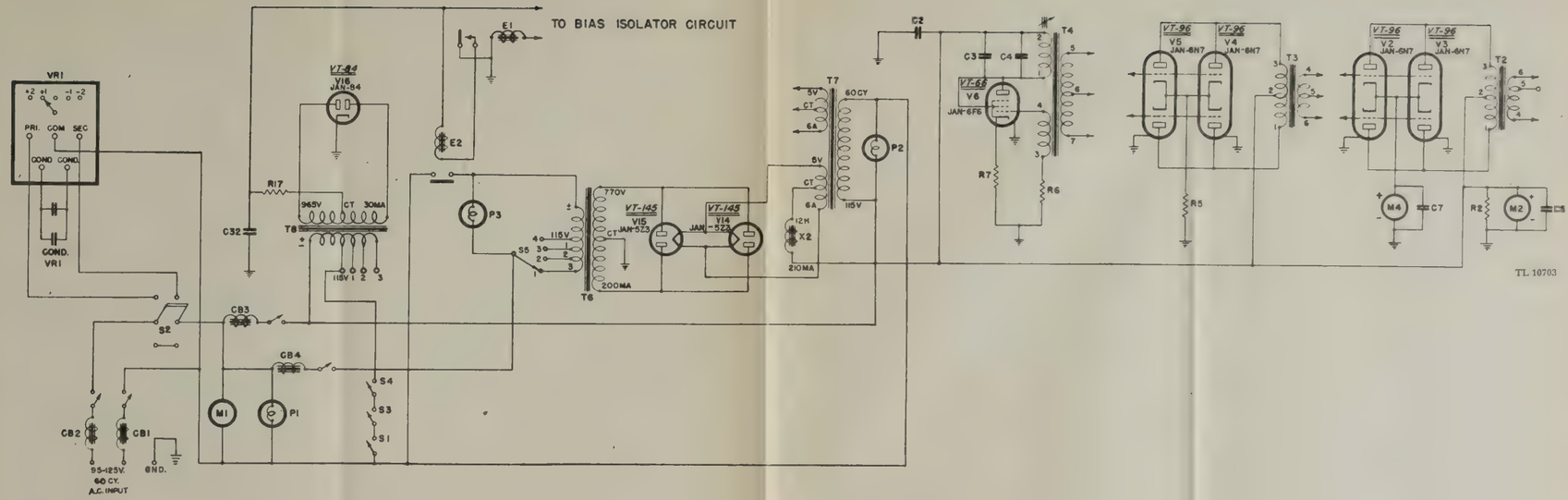


Figure 21. Low voltage functional diagram.



FUNCTIONS AND ELECTRICAL VALUES OF PARTS

CAPACITORS

- C2 A-f power supply filter (10 mfd, 600 v d-c working)
- C3 A-f oscillator tuning, matched pair (10,000 mmfd, 600 v d-c working)
- C4 A-f oscillator tuning, matched pair (25,000 mmfd, 600 v d-c working)
- C5 Meter M2 bypass (5,000 mmfd, 500 v d-c working)
- C7 Meter M4 bypass (5,000 mmfd, 500 v d-c working)
- C32 Bias filter (10 mfd, 600 v d-c working)

COND

- VR1 Part of voltage regulator VR1

CIRCUIT BREAKERS

- CB1 A-c line (4.6 amp, 120 v)
- CB2 A-c line (4.6 amp, 120 v)
- CB3 Filament and bias supply (1.6 amp, 120 v)
- CB4 Plate overload (2.6 amp, 120 v)

COIL

- X2 A-f high voltage filter (12 henries)

METERS

- M1 A-c line voltage (0-150 v a-c)
- M2 A-f plate voltage (0-500 v d-c)
- M4 Modulator plate current (0-300 ma d-c)

RECEPTACLES

- P1 A-c line pilot
- P2 Filament pilot
- P3 Plate pilot

RELAYS

- E1 Bias interlock control
- E2 Bias interlock plate

RESISTORS

- R2 R-f power supply bleeder (9,000 ohms, 60 w)
- R5 Audio driver cathode (500 ohms, 2 w)
- R6 Audio oscillator grid (1,000 ohms, 2 w)
- R7 Audio oscillator cathode (3,000 ohms, 2 w)
- R17 Bias dropping (12,500 ohms, 60 w)

SWITCHES

- S1 Rear door safety interlock
- S2 Voltage regulator selector
- S3 Front left door safety interlock
- S4 Front right door safety interlock
- S5 Plate voltage control

TRANSFORMERS

- T2 Modulation
- T3 Audio driver
- T4 Audio oscillator and output
- T6 A-f high voltage plate
- T7 High voltage rectifier filament
- T8 Bias rectifier plate

TUBES

- V2 Modulator
- V3 Modulator
- V4 Audio driver
- V5 Audio driver
- V6 Audio oscillator
- V14 A-f high voltage rectifier
- V15 A-f high voltage rectifier
- V16 Bias rectifier

Figure 21. Low voltage functional diagram.

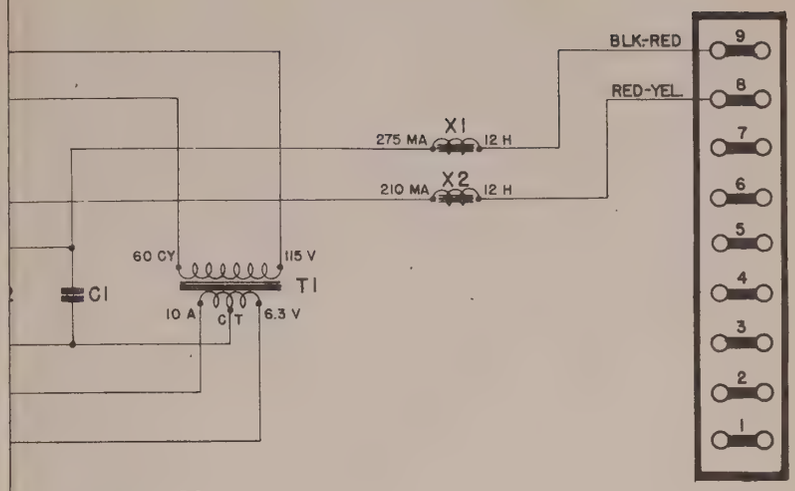


Figure 22

TL 10704

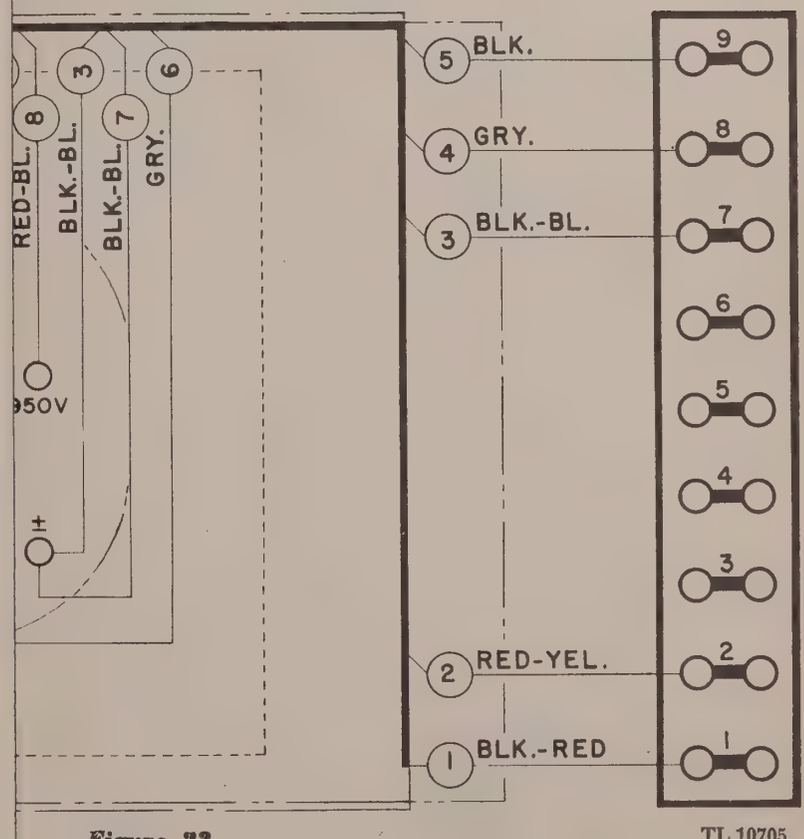


Figure 23

TL 10705

Figure 22. Power filter unit, schematic diagram.

Figure 23. Power rectifier unit, wiring diagram.

FUNCTIONS AND ELECTRICAL VALUES OF PARTS

CAPACITORS

C1 R-f power supply filter (10 mfd, 600 v d-c working)

C2 A-f power supply filter (10 mfd, 600 v d-c working)

COILS

X1 R-f high voltage filter (12 henries)

X2 A-f high voltage filter (12 henries)

RESISTORS

R1 R-f power supply bleeder (9,400 ohms, 60 w)

R2 R-f power supply bleeder (9,000 ohms, 60 w)

TRANSFORMER

T1 R-f and a-f heaters

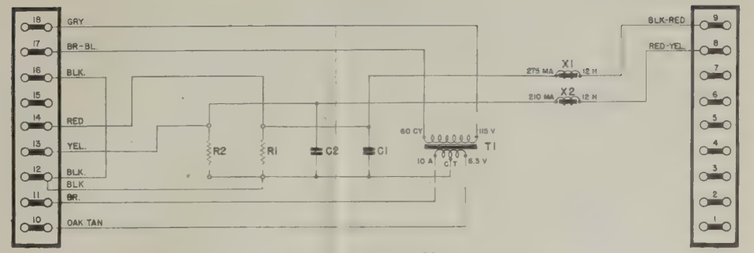


Figure 22

TL 10704

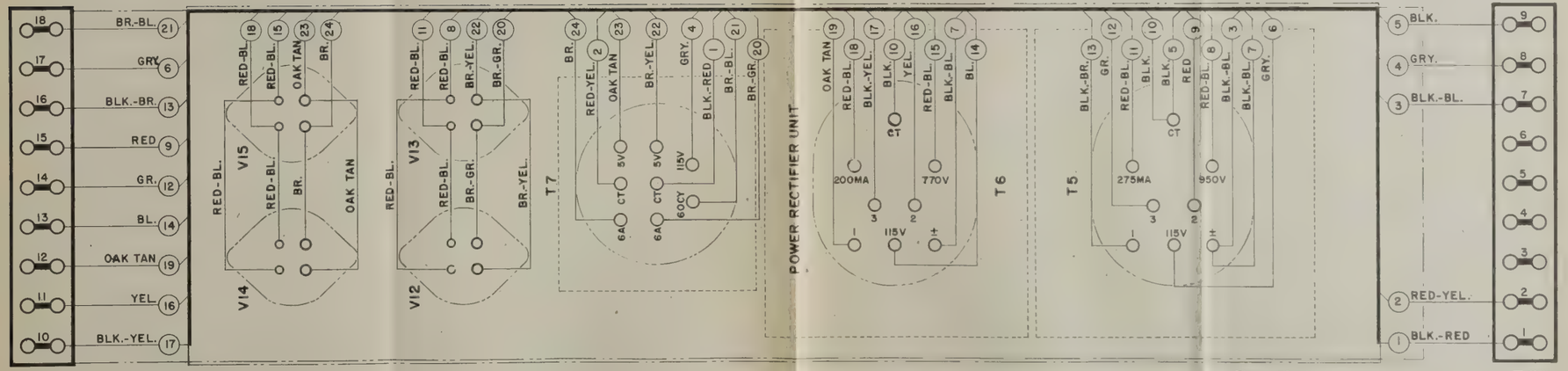
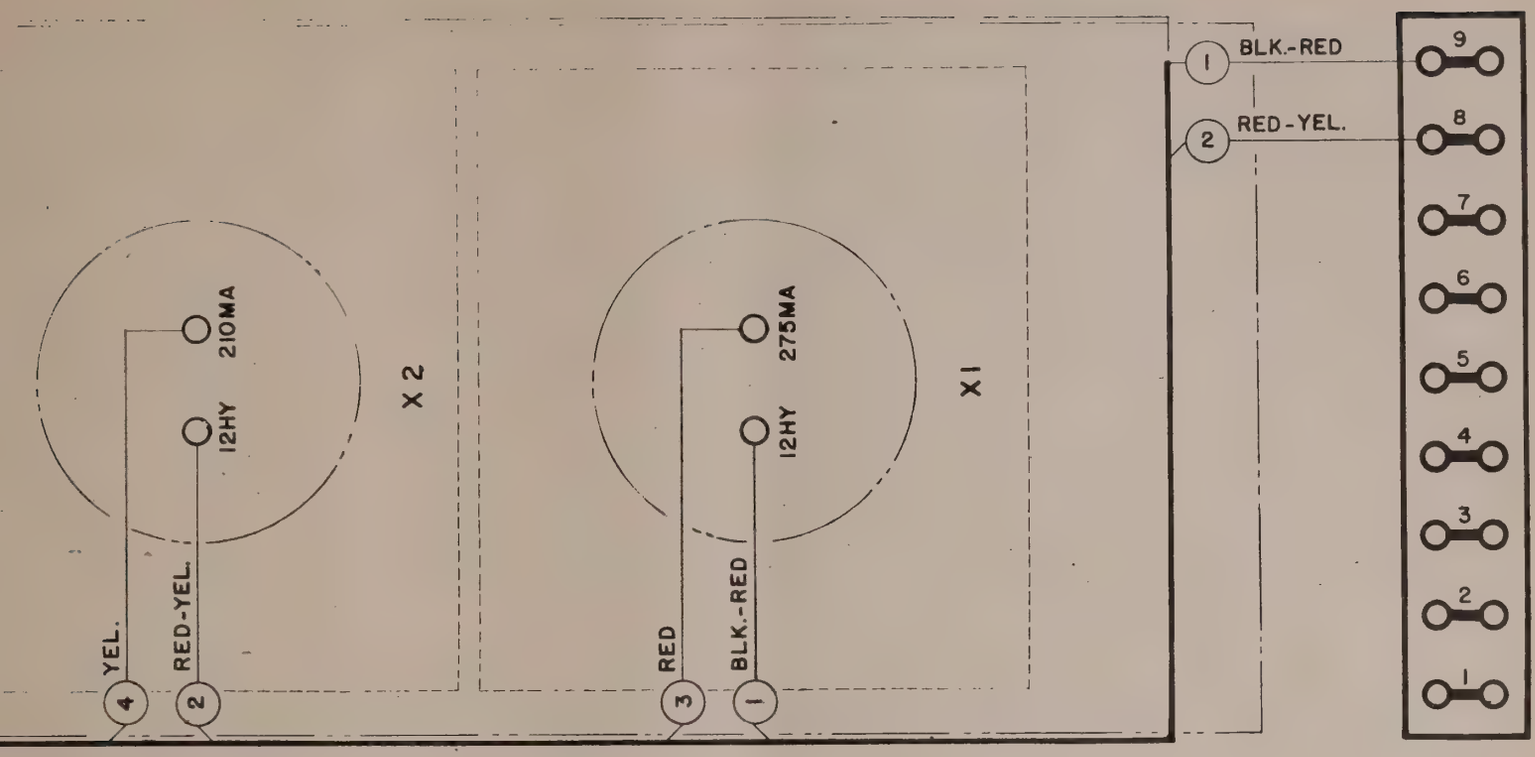


Figure 23

TL 10705

Figure 22. Power filter unit, schematic diagram.

Figure 23. Power rectifier unit, wiring diagram.



TL 10706

Figure 24. Power filter unit, wiring diagram.

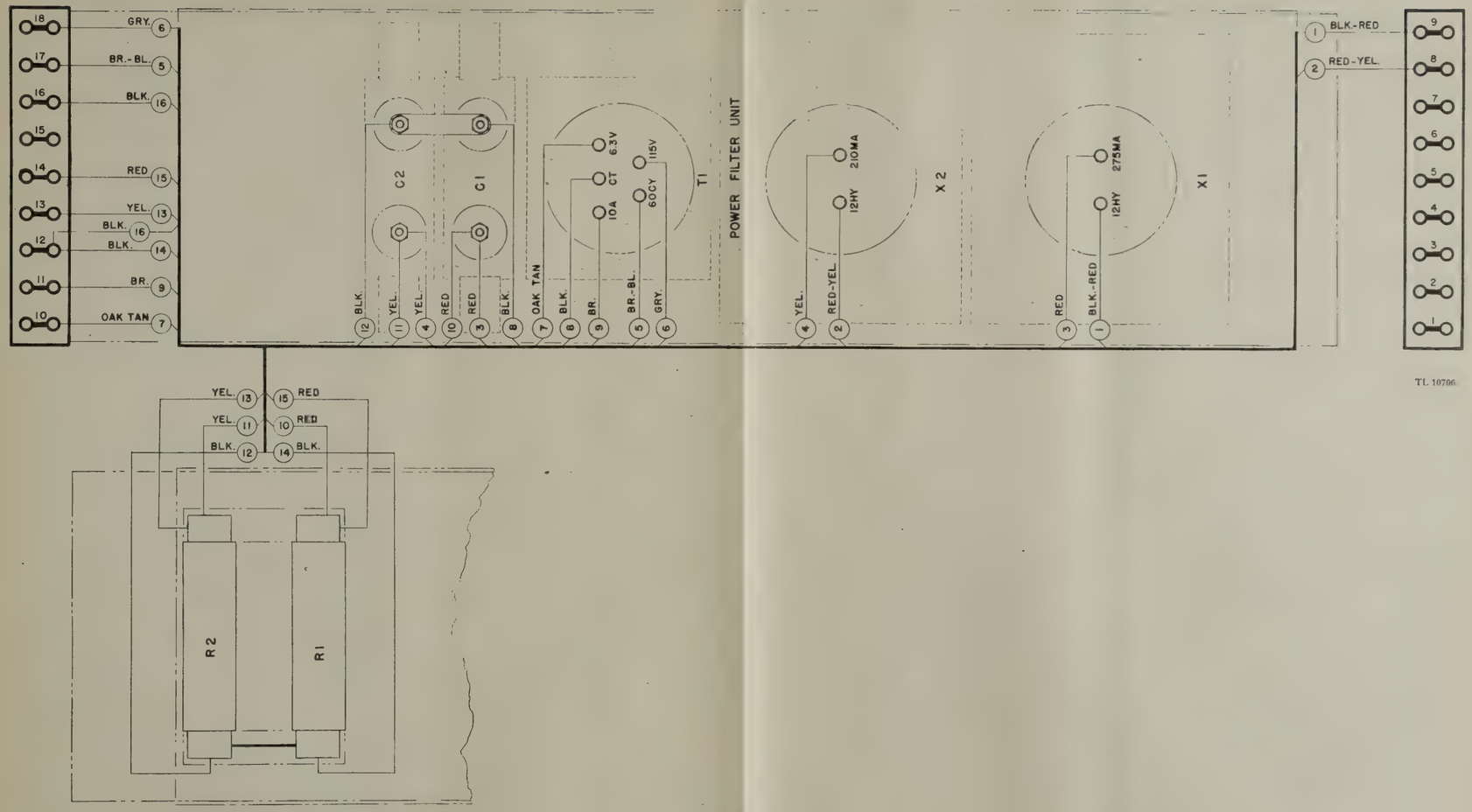


Figure 24. Power filter unit, wiring diagram.

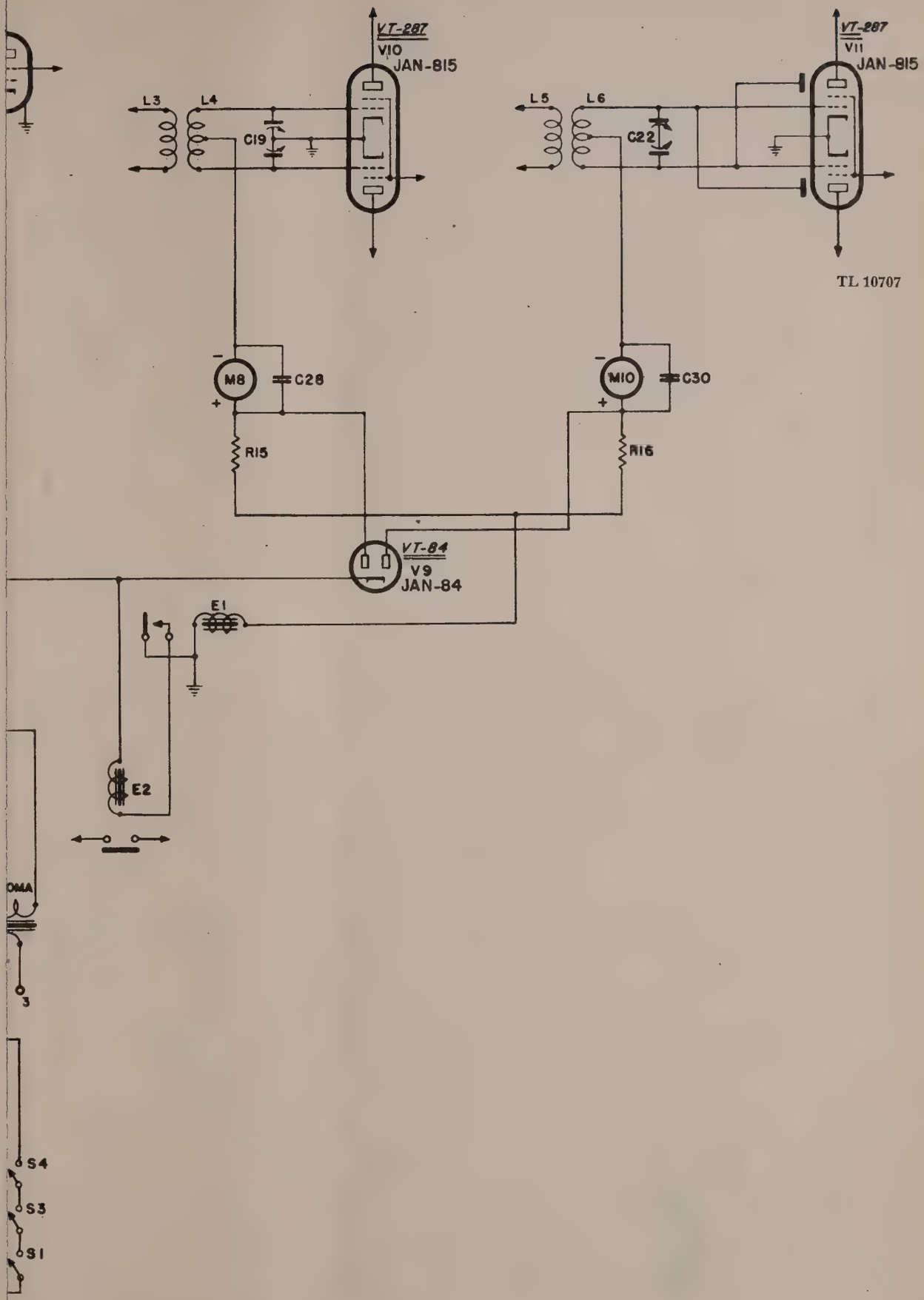


Figure 25. Bias supply and isolator circuit, functional diagram.

FUNCTIONS AND ELECTRICAL VALUES OF PARTS

CAPACITORS

C14	2nd multiplier grid coupling (22 mmfd, 500 v d-c working)
C19	3rd multiplier grid tuning (35 mmfd, per section dual, variable)
C22	P-a grid tuning (3-15 mmfd, per section dual, variable)
C28	Meter M8 bypass (5,000 mmfd, 500 v d-c working)
C30	Meter M10 bypass (5,000 mmfd, 500 v d-c working)
C32	Bias filter (10 mfd, 600 v d-c working)
COND VR1	Part of voltage regulator VR1

CIRCUIT BREAKERS

CB1	A-c line (4.6 amp, 120 v)
CB2	A-c line (4.6 amp, 120 v)
CB3	Filament and bias supply (1.6 amp, 120 v)

COILS

L3	2nd multiplier plate tuning
L4	3rd multiplier grid tuning
L5	3rd multiplier plate tuning
L6	P-a grid tuning

METERS

M8	3rd multiplier grid current (0-100 ma d-c)
M10	P-a grid current (0-15 ma a-c)

RELAYS

E1	Bias interlock control
E2	Bias interlock plate

RESISTORS

R13	2nd multiplier grid (50,000 ohms, 2 w)
R15	3rd multiplier grid (50,000 ohms, 2 w)
R16	P-a grid (20,000 ohms, 2 w)
R17	Bias dropping (12,500 ohms, 60 w)

SWITCHES

S1	Rear door safety interlock
S2	Voltage regulator selector
S3	Front left door safety interlock
S4	Front right door safety interlock

TRANSFORMER

T8	Bias rectifier plate

TUBES

V8	2nd multiplier
V9	Bias isolator
V10	3rd multiplier
V11	Power amplifier
V16	Bias rectifier

VOLTAGE REGULATOR

VR1	A-c line

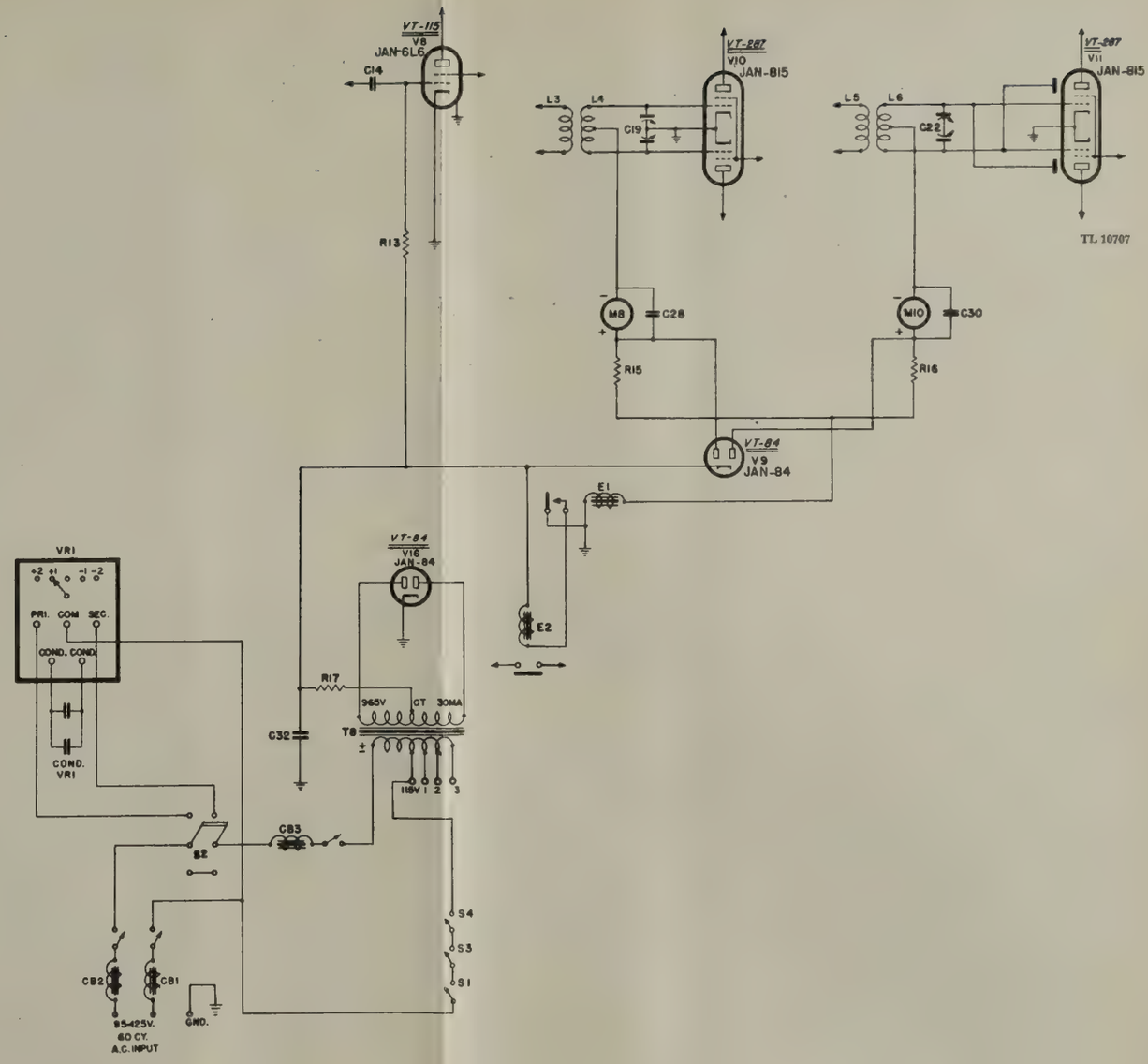


Figure 25. Bias supply and isolator circuit, functional diagram.

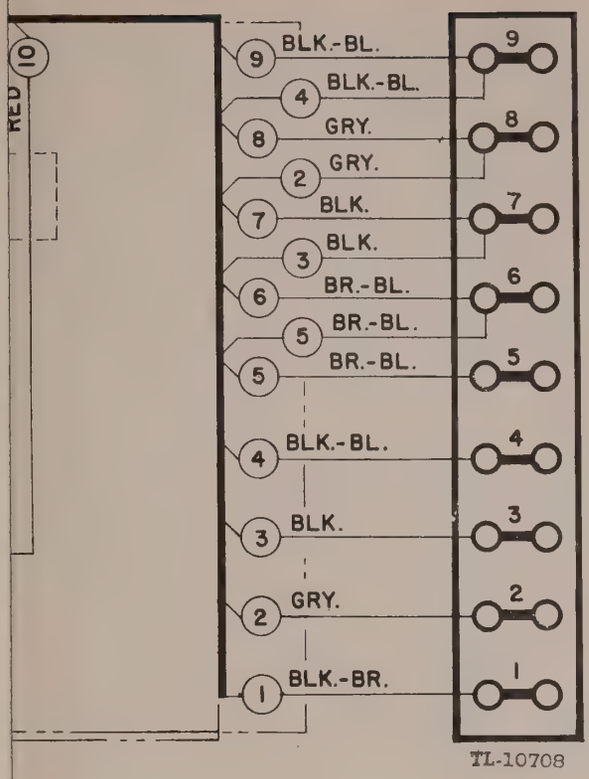


Figure 26

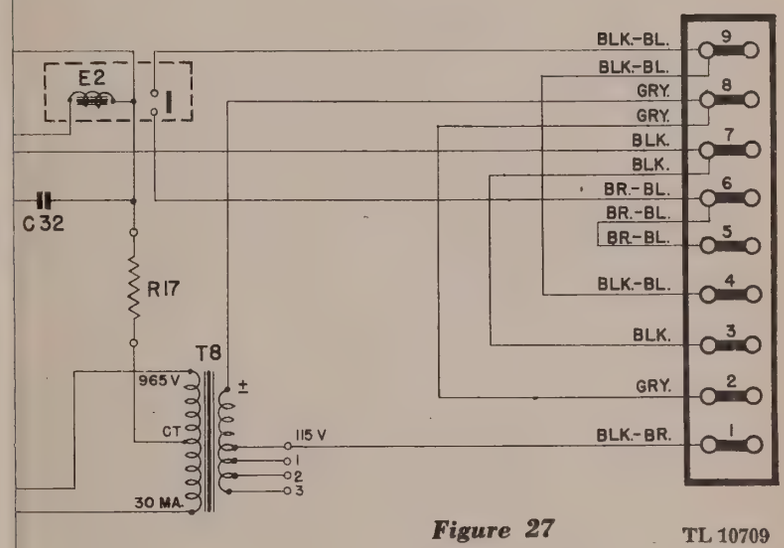


Figure 27

TL 10709

TIONS AND ELECTRICAL VALUES OF PARTS

(10 mfd,
working)

ck control
ck plate

ing (12,500 ohms,

multiplier plate
(5,000 ohms, 60 w)

RESISTORS (cont'd)

R19	2nd multiplier plate dropping (3,000 ohms, 60 w)
R20	2nd and 3rd multiplier screen dropping (17,500 ohms, 60 w)
R21	3rd multiplier plate dropping (2,500 ohms, 60 w)

TRANSFORMER

T8	Bias rectifier plate

TUBE

V16	Bias rectifier

Figure 26. Bias and relay unit, wiring diagram.

Figure 27. Bias and relay unit, schematic diagram.

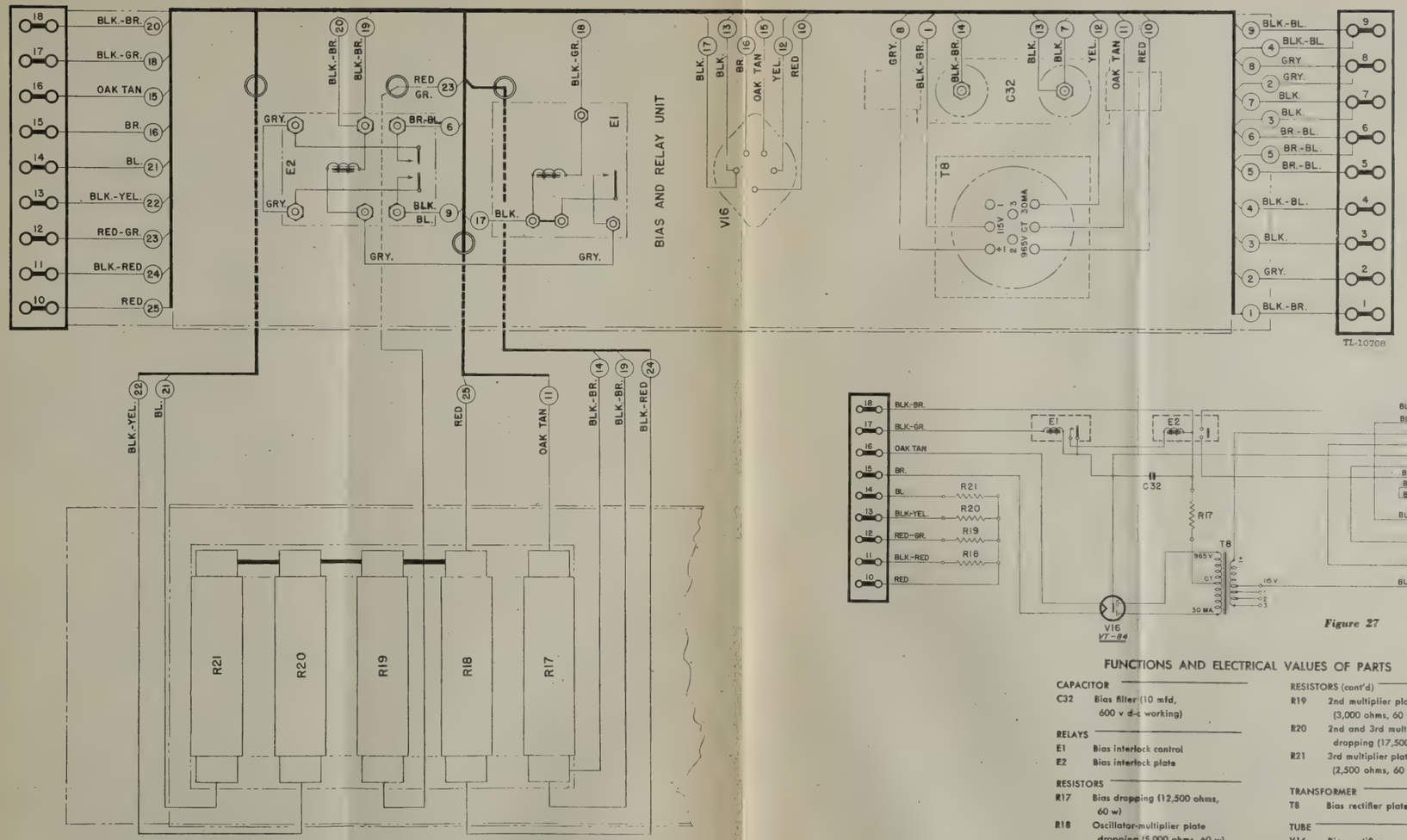


Figure 26

Figure 27

FUNCTIONS AND ELECTRICAL VALUES OF PARTS

CAPACITOR

C32 Bias filter (10 mfd, 600 v d-c working)

RELAYS

E1 Bias interlock control

E2 Bias interlock plate

RESISTORS

R17 Bias dropping (12,500 ohms, 60 w)

R18 Oscillator-multiplier plate dropping (5,000 ohms, 60 w)

RESISTORS (cont'd)

R19 2nd multiplier plate dropping (3,000 ohms, 60 w)

R20 2nd and 3rd multiplier screen dropping (17,500 ohms, 60 w)

R21 3rd multiplier plate dropping (2,500 ohms, 60 w)

TRANSFORMER

T8 Bias rectifier plate

TUBE

V16 Bias rectifier

Figure 26. Bias and relay unit, wiring diagram.

Figure 27. Bias and relay unit, schematic diagram.

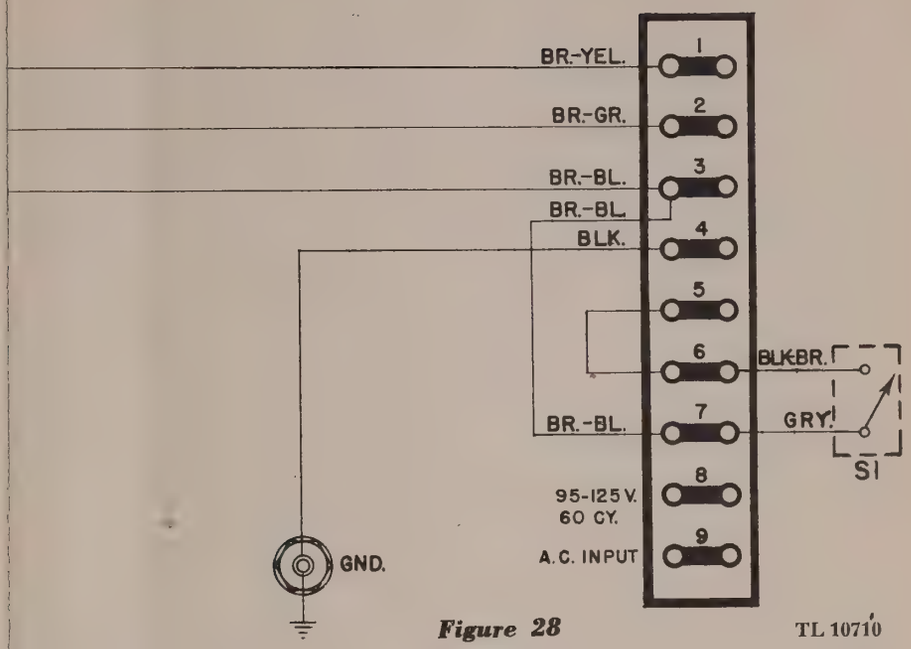


Figure 28

TL 10710

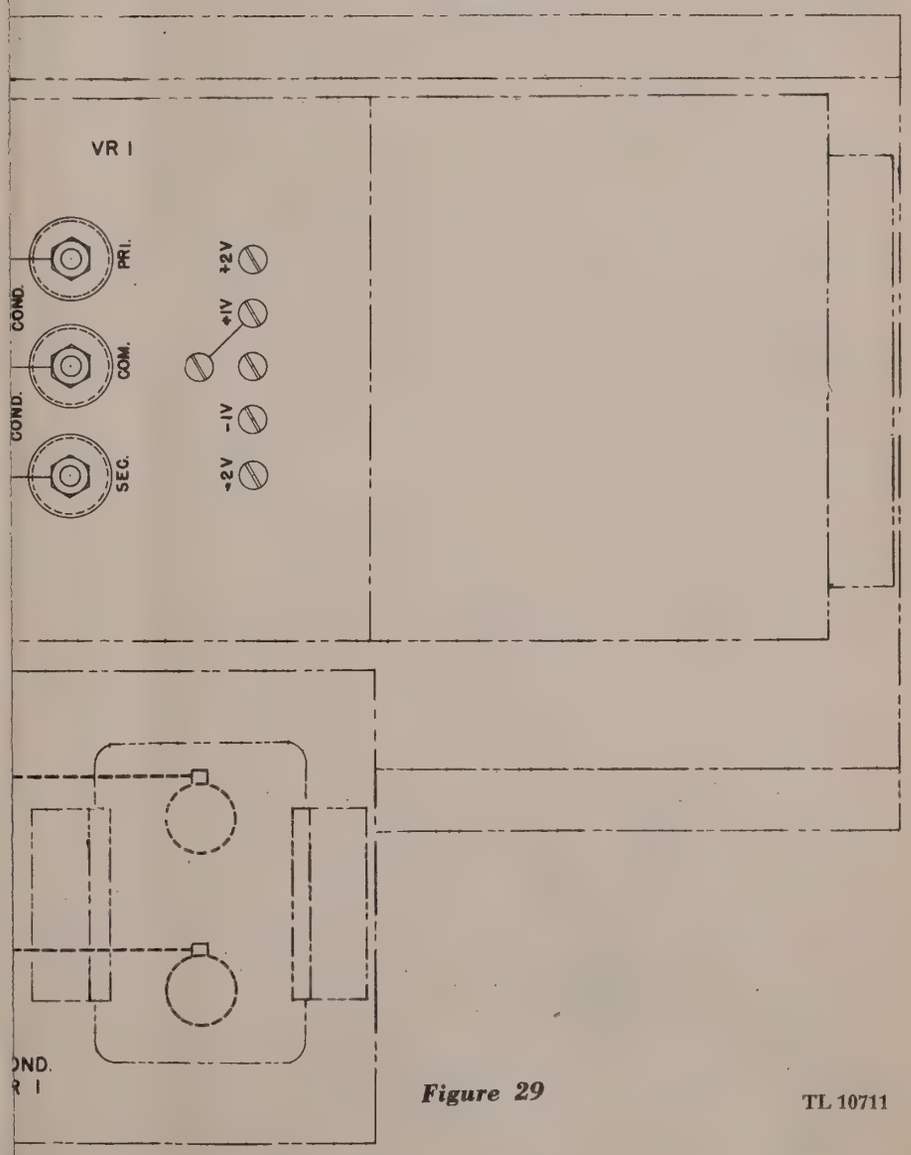


Figure 29

TL 10711

Figure 28. Voltage regulator unit, schematic diagram.

Figure 29. Voltage regulator unit, wiring diagram.

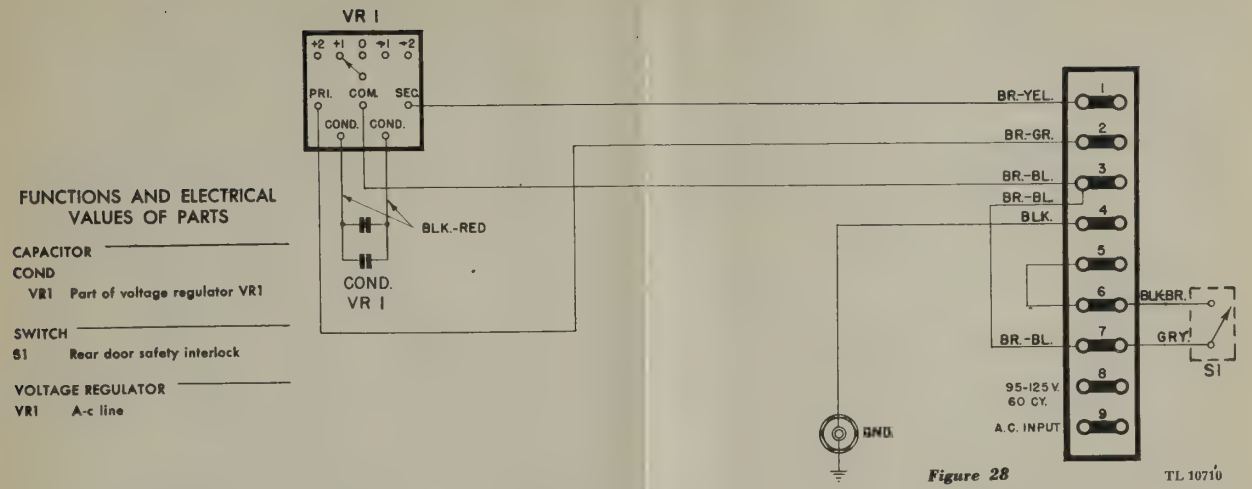


Figure 28

TL 10710

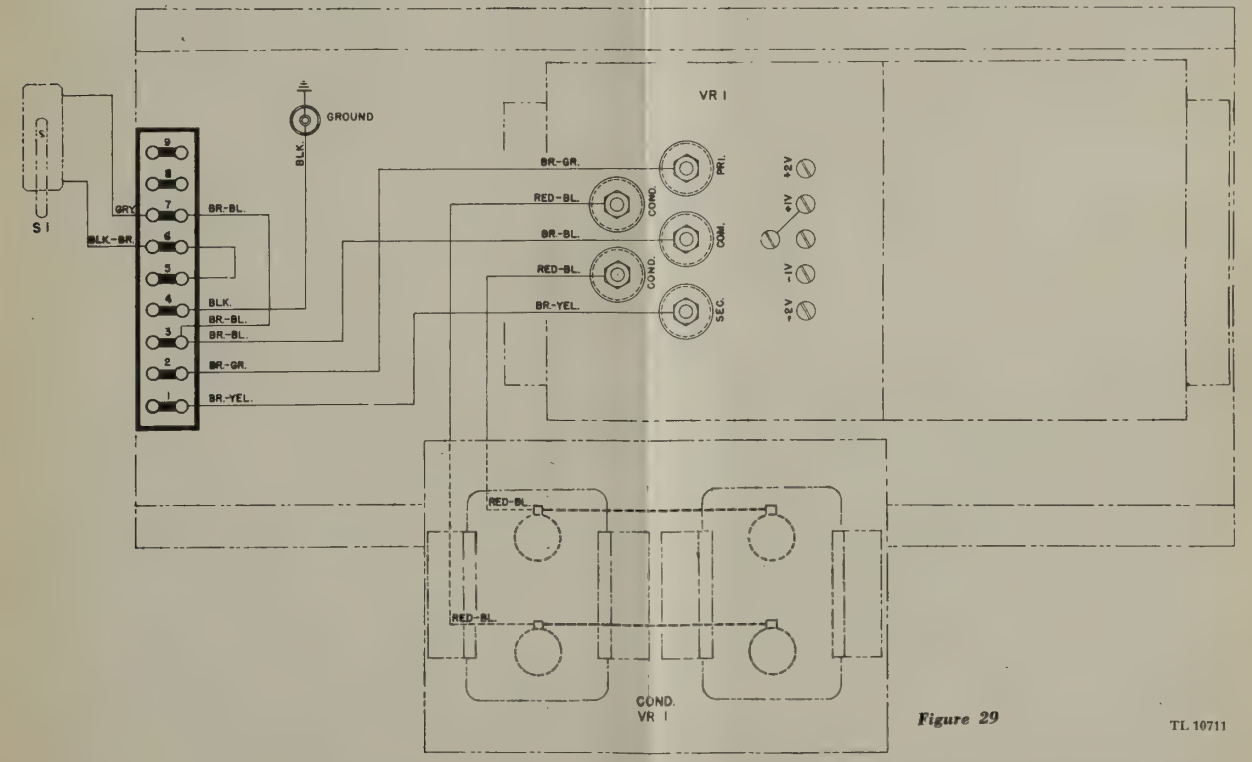
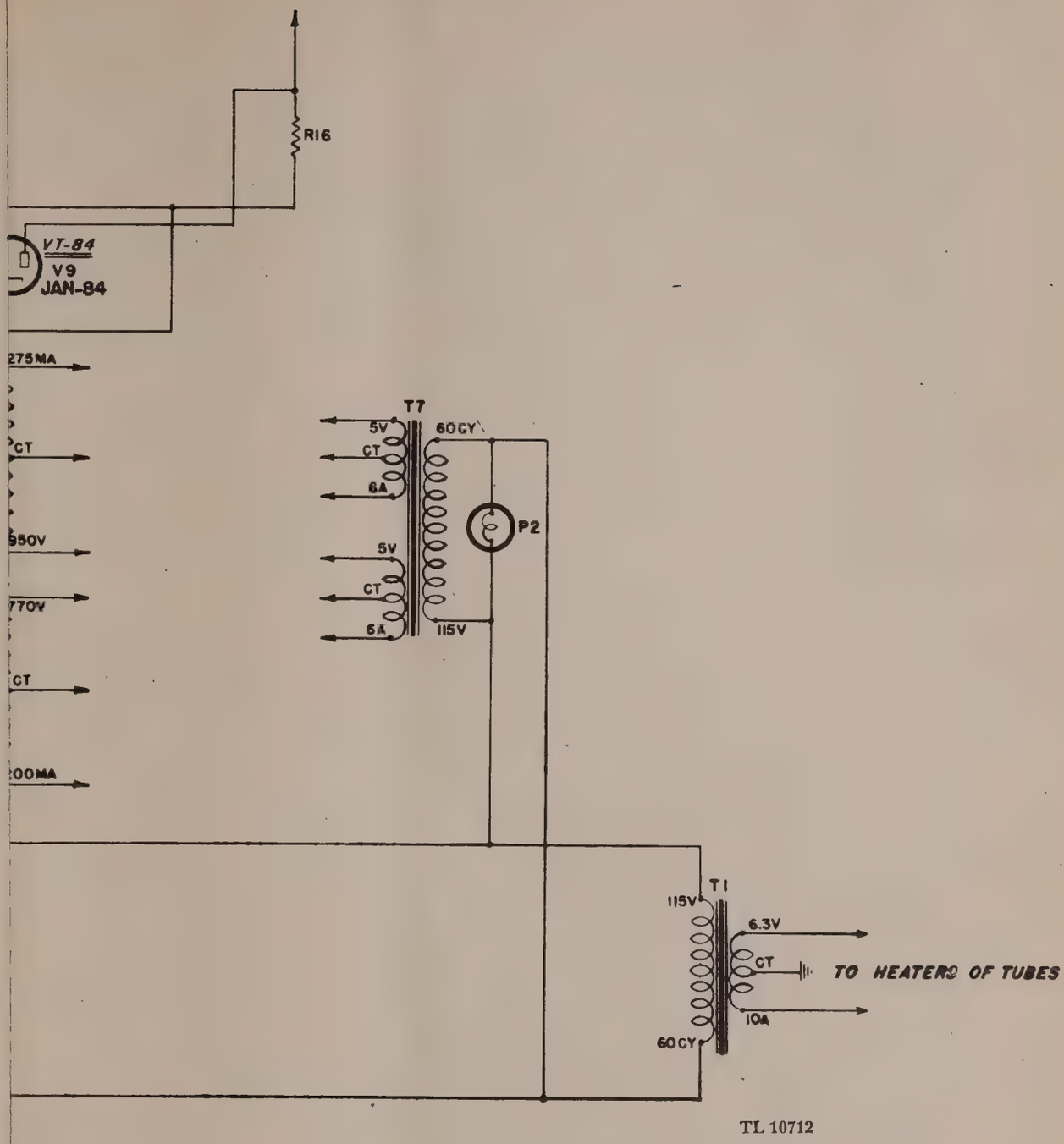


Figure 29

TL 10711

Figure 28. Voltage regulator unit, schematic diagram.

Figure 29. Voltage regulator unit, wiring diagram.



TL 10712

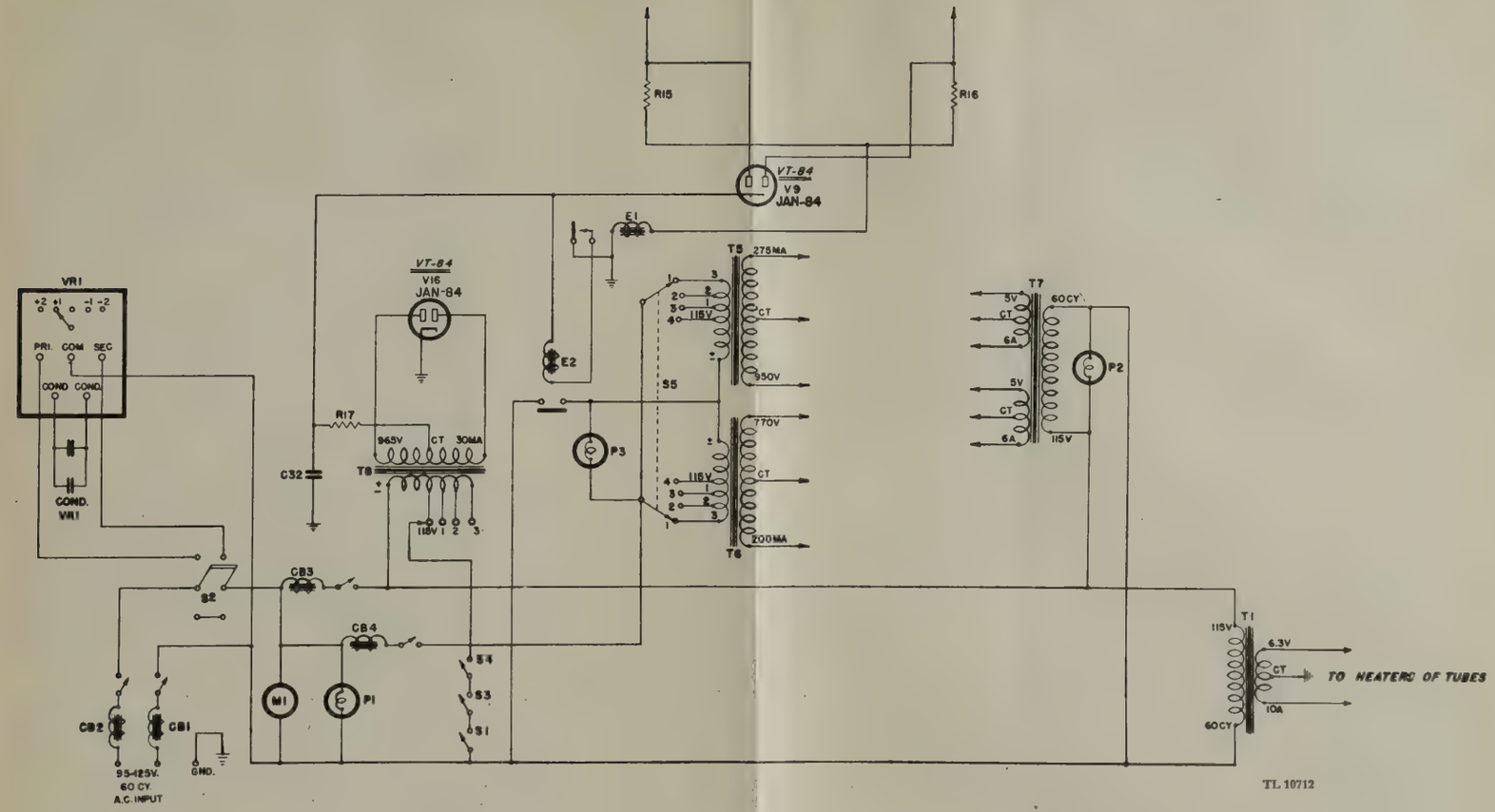
r door safety interlock
tage regulator selector
nt left door safety interlock
nt right door safety interlock

MERS
and a-f heaters
high voltage plate
high voltage plate
h voltage rectifier filament
s rectifier plate

s isolator
s rectifier

EGULATOR
line

Figure 30. *A-c and control circuit, functional diagram.*



FUNCTIONS AND ELECTRICAL VALUES OF PARTS

CAPACITORS

C32	Bias filter (10 mfd, 600 v d-c working)
COND VR1	Part of voltage regulator VR1

CIRCUIT BREAKERS

CB1	A-c line (4.6 amp, 120 v)
CB2	A-c line (4.6 amp, 120 v)
CB3	Filament and bias supply (1.6 amp, 120 v)
CB4	Plate overload (2.6 amp, 120 v)

METER

M1	A-c line voltage

RECEPTACLES

P1	A-c line pilot
P2	Filament pilot
P3	Plate pilot

RELAYS

E1	Bias interlock control
E2	Bias interlock plate

RESISTORS

R15	3rd multiplier grid (50,000 ohms, 2 w)
R16	P-a grid (20,000 ohms, 2 w)
R17	Bias dropping (12,500 ohms, 60 w)

SWITCHES

S1	Rear door safety interlock
S2	Voltage regulator selector
S3	Front left door safety interlock
S4	Front right door safety interlock

TRANSFORMERS

T1	R-f and a-f heaters
T5	R-f high voltage plate
T6	A-f high voltage plate
T7	High voltage rectifier filament
T8	Bias rectifier plate

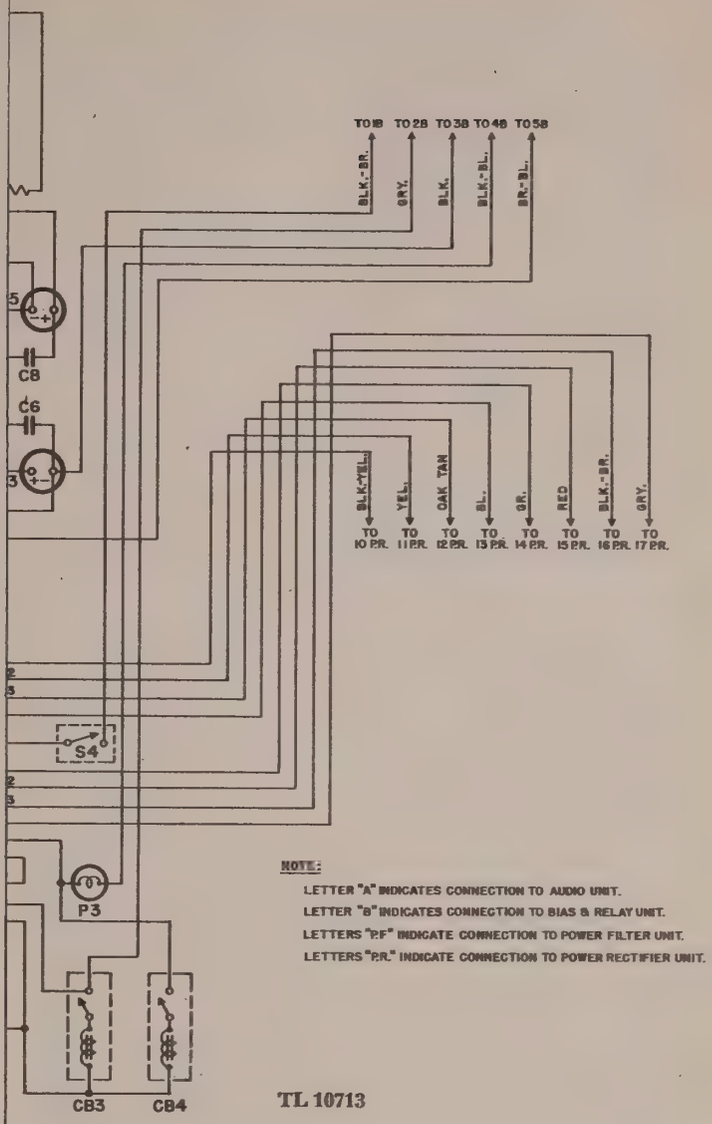
TUBES

V9	Bias isolator
V16	Bias rectifier

VOLTAGE REGULATOR

VR1	A-c line

Figure 30. A-c and control circuit, functional diagram.



IONS AND ELECTRICAL VALUES OF PARTS

ss (5,000 mmfd,
king)
ss (5,000 mmfd,
king)
ss (5,000 mmfd,
king)
ss (5,000 mmfd,
king)

p, 120 v)
p, 120 v)
ias supply
v)
2.6 amp, 120 v)

(0-150 v a-c)
ge (0-500 v d-c)

METERS (cont'd)

M3	R-f plate voltage (0-500 v d-c)
M4	Modulator plate current (0-300 ma d-c)
M5	Modulation (0-1 ma d-c)

POTENTIOMETER

R10	Modulation level control (500,000 ohms, dual)

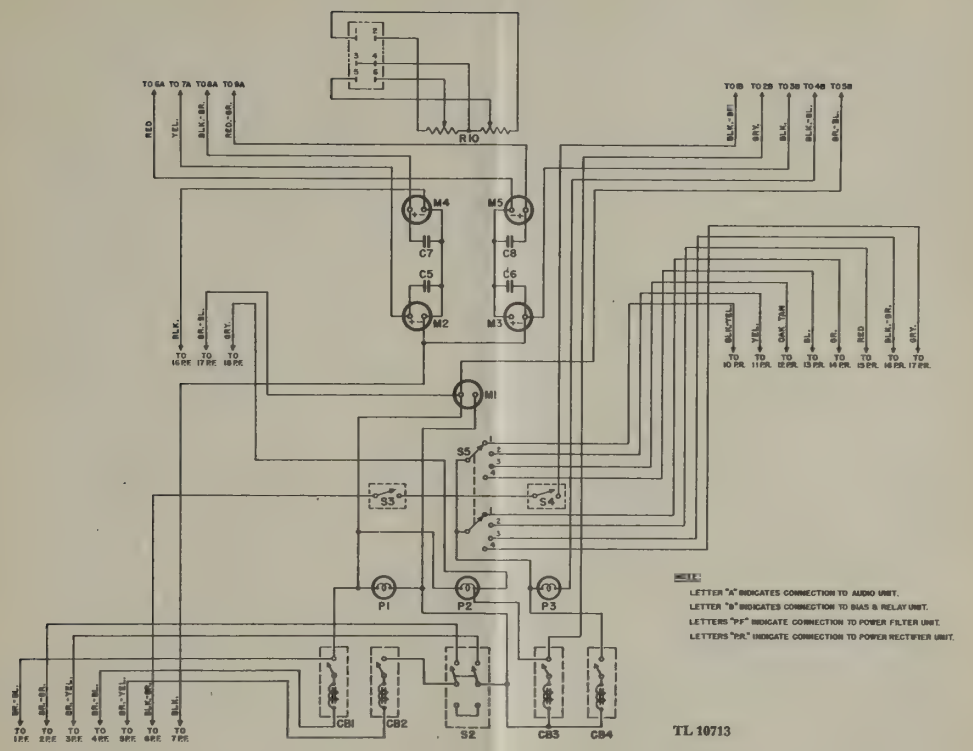
RECEPTACLES

P1	A-c line pilot
P2	Filament pilot
P3	Plate pilot

SWITCHES

S2	Voltage regulator selector
S3	Front left door safety interlock
S4	Front right door safety interlock
S5	Plate voltage control

Figure 31. Control unit, schematic diagram.



FUNCTIONS AND ELECTRICAL VALUES OF PARTS

CAPACITORS

C5	Meter M2 bypass (5,000 mmfd, 500 v d-c working)
C6	Meter M3 bypass (5,000 mmfd, 500 v d-c working)
C7	Meter M4 bypass (5,000 mmfd, 500 v d-c working)
C8	Meter M5 bypass (5,000 mmfd, 500 v d-c working)

CIRCUIT BREAKERS

CB1	A-c line (4.6 amp, 120 v)
CB2	A-c line (4.6 amp, 120 v)
CB3	Filament and bias supply (1.6 amp, 120 v)
CB4	Plate overload (2.6 amp, 120 v)

METERS

M1	A-c line voltage (0-150 v a-c)
M2	A-f plate voltage (0-500 v d-c)

METERS (cont'd)

M3	R-f plate voltage (0-500 v d-c)
M4	Modulator plate current (0-300 ma d-c)
M5	Modulation (0-1 ma d-c)

POTENTIOMETER

R10	Modulation level control (500,000 ohms, dual)

RECEPTACLES

P1	A-c line pilot
P2	Filament pilot
P3	Plate pilot

SWITCHES

S2	Voltage regulator selector
S3	Front left door safety interlock
S4	Front right door safety interlock
S5	Plate voltage control

Figure 31. Control unit, schematic diagram.

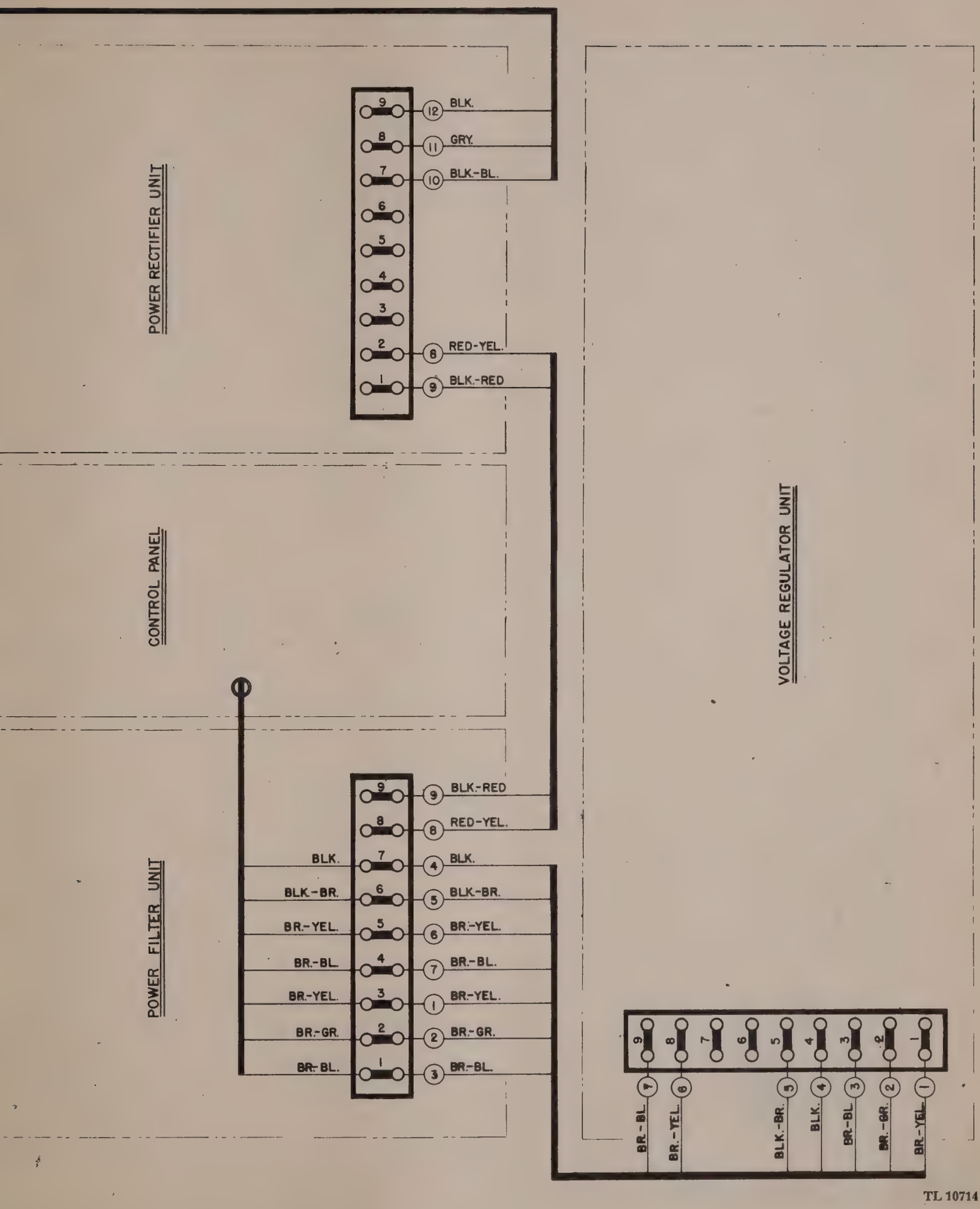


Figure 32. Interconnecting cable diagram.

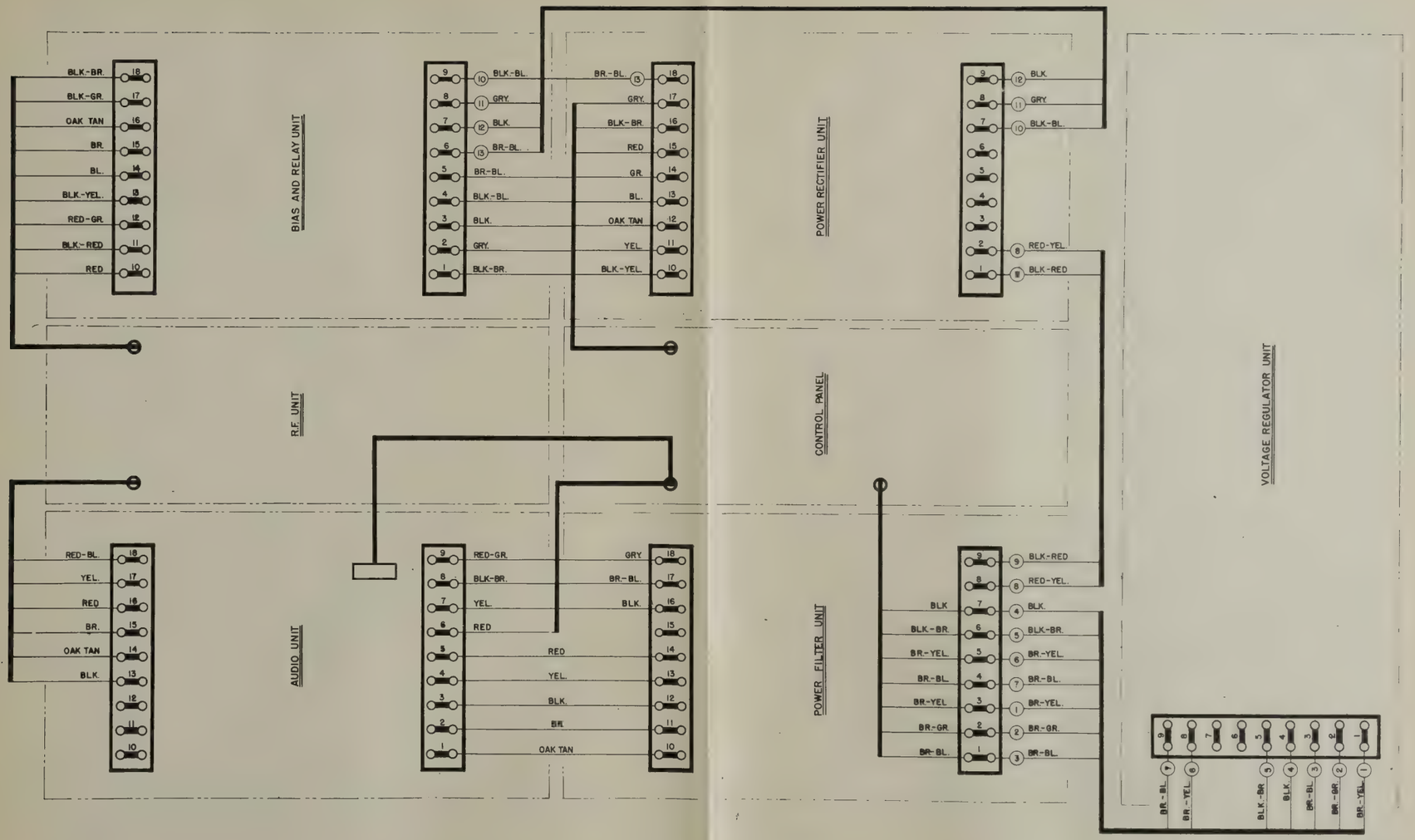
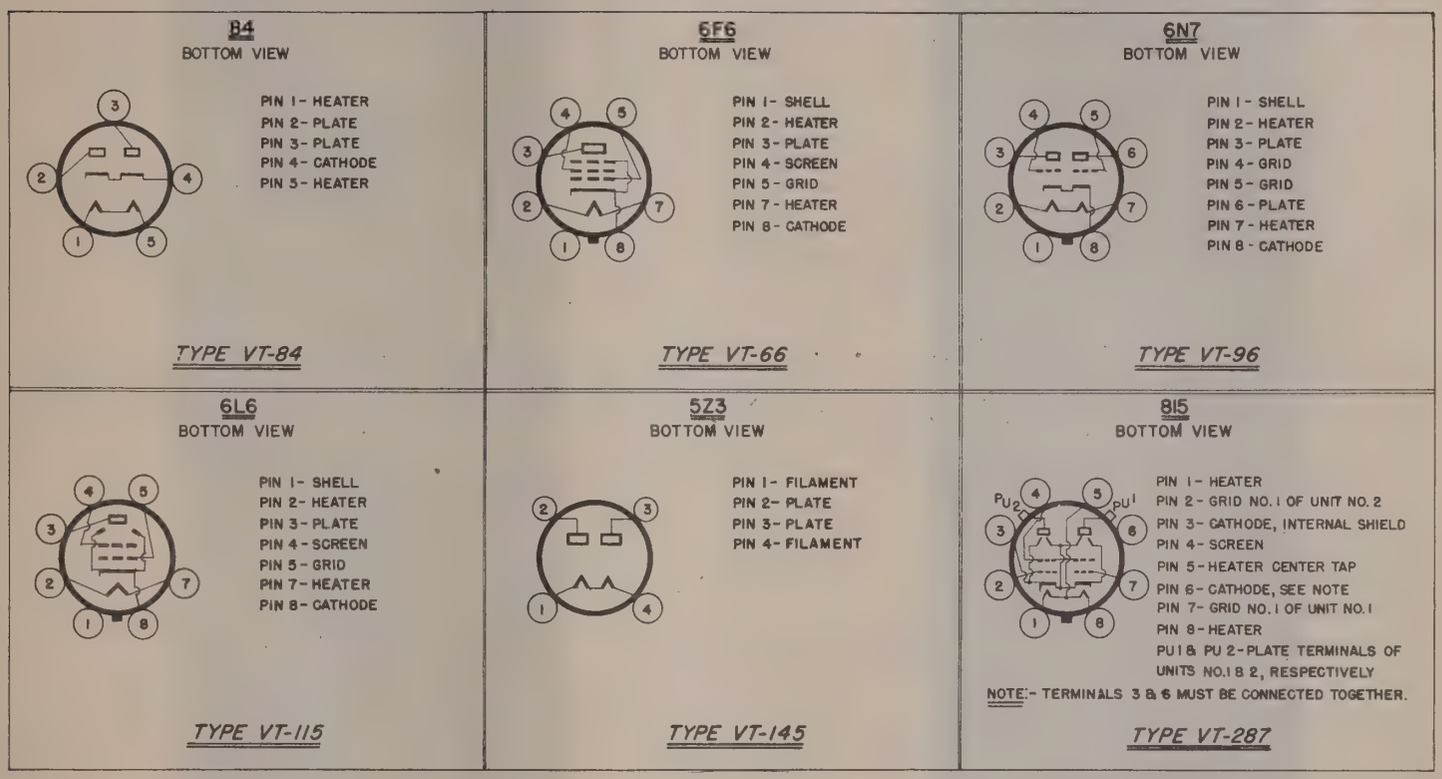
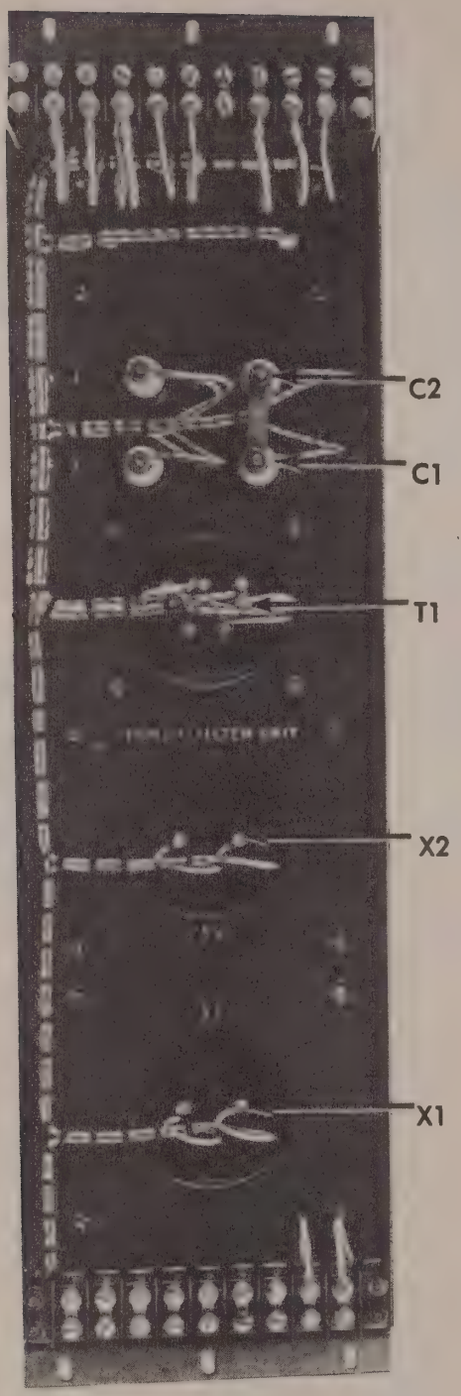


Figure 32. Interconnecting cable diagram.



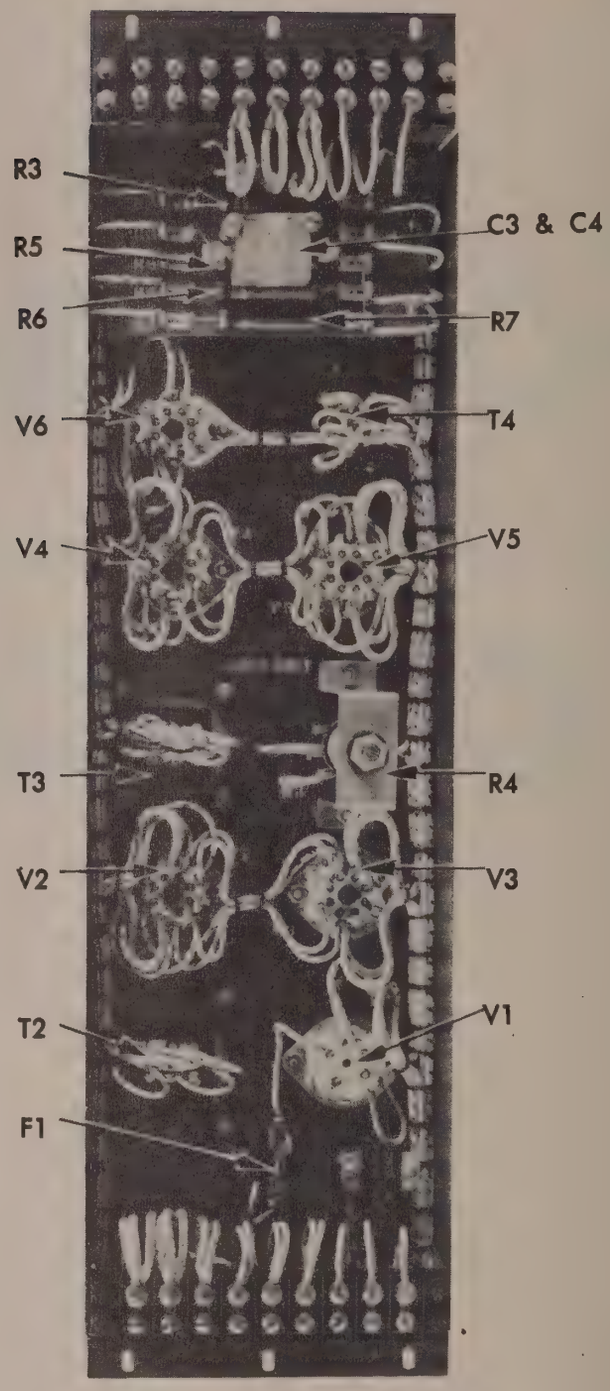
TL 10686

Figure 33.—Tube base connections.



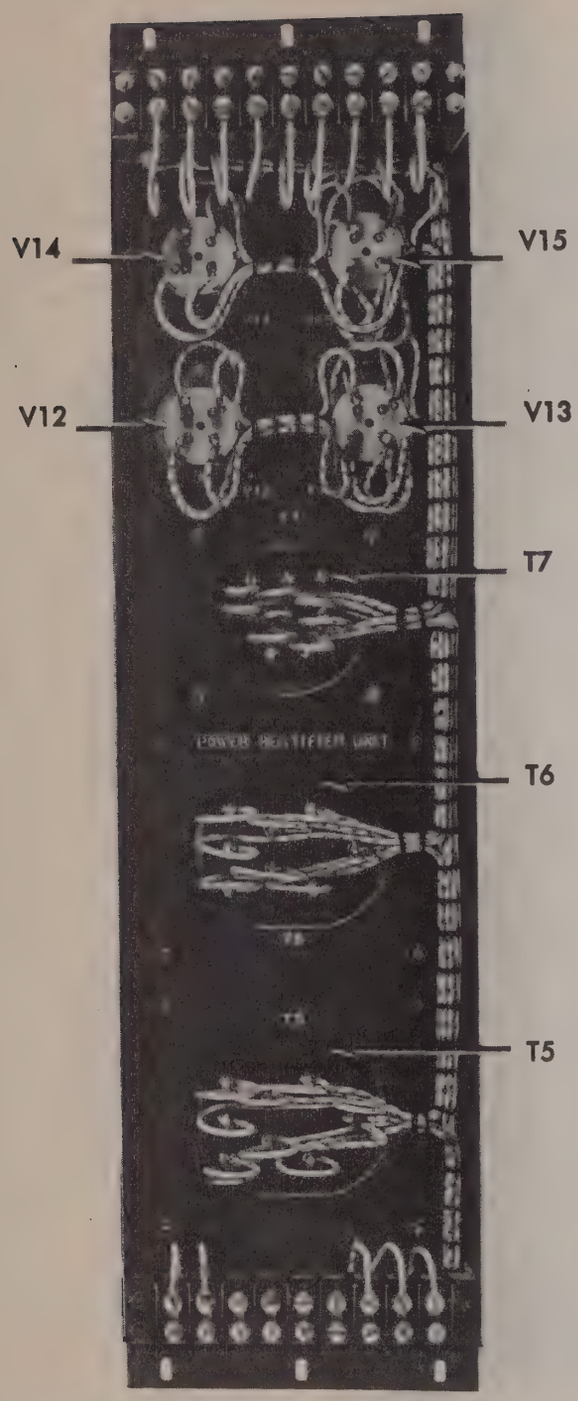
TL 10687

Figure 34. Power filter unit, front view.



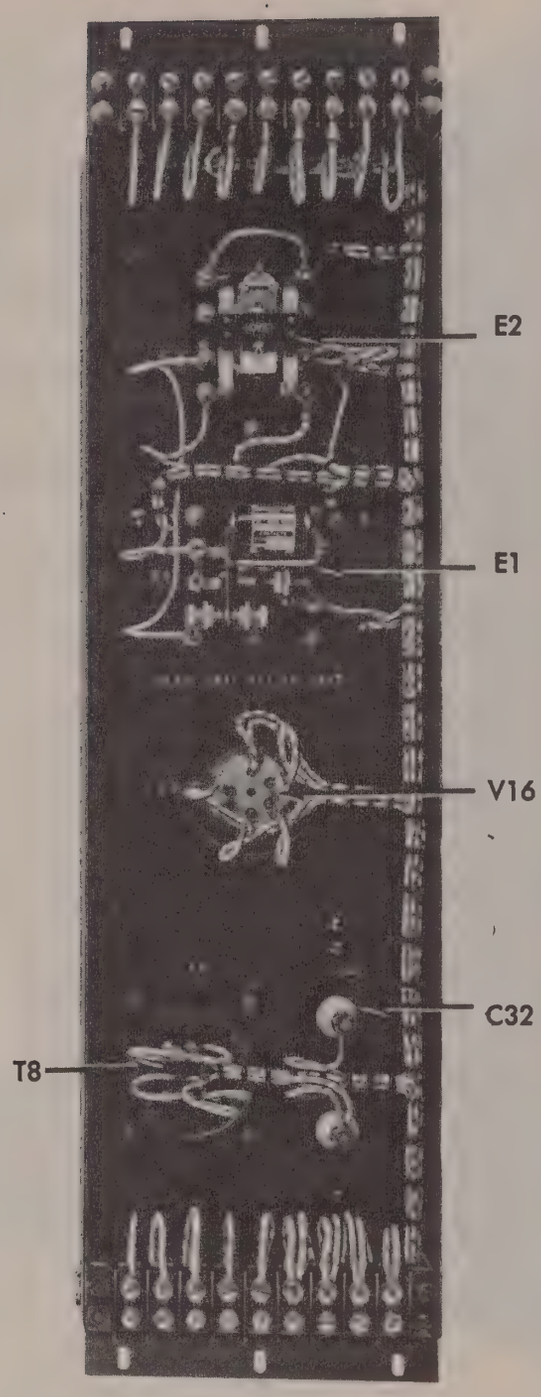
TL 10688

Figure 35. Audio unit, front view.



TL 10689

Figure 36. Power rectifier unit, front view.



TL 10690

Figure 37. Bias and relay unit, front view.

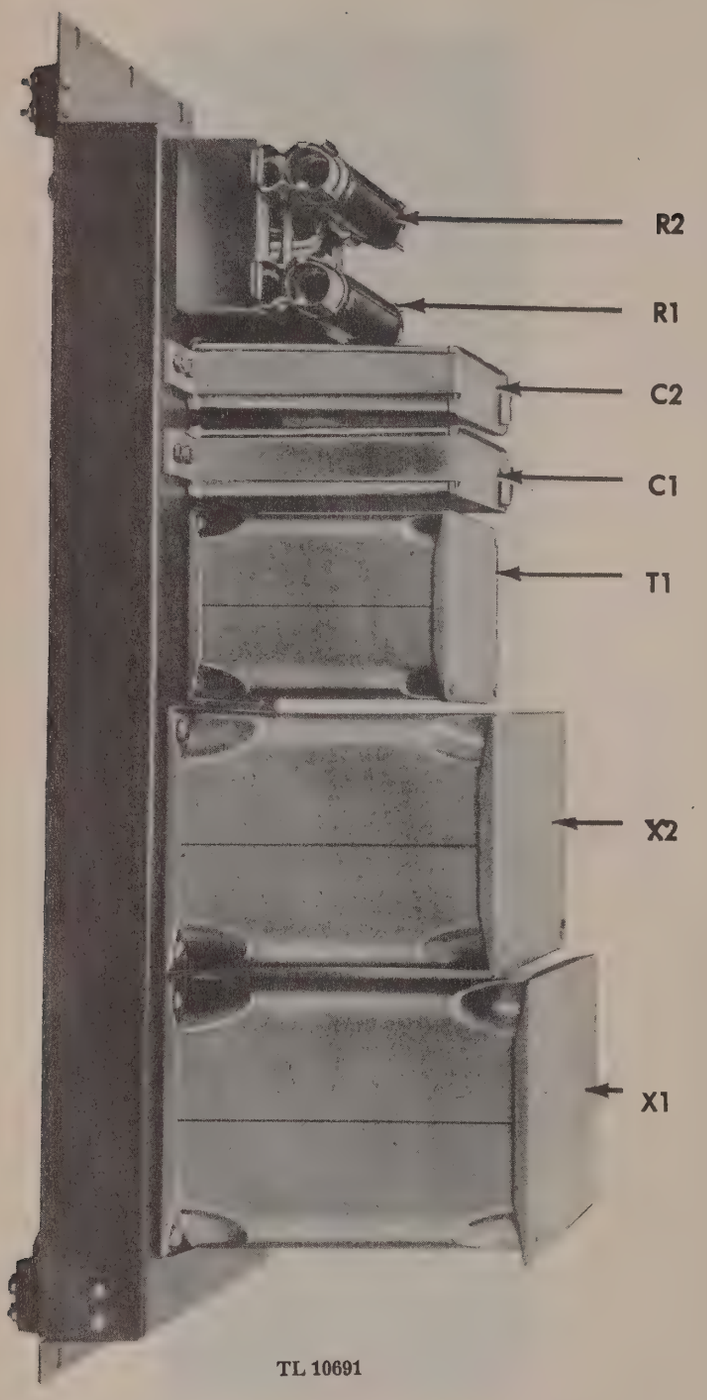


Figure 38. Power filter unit, rear view.

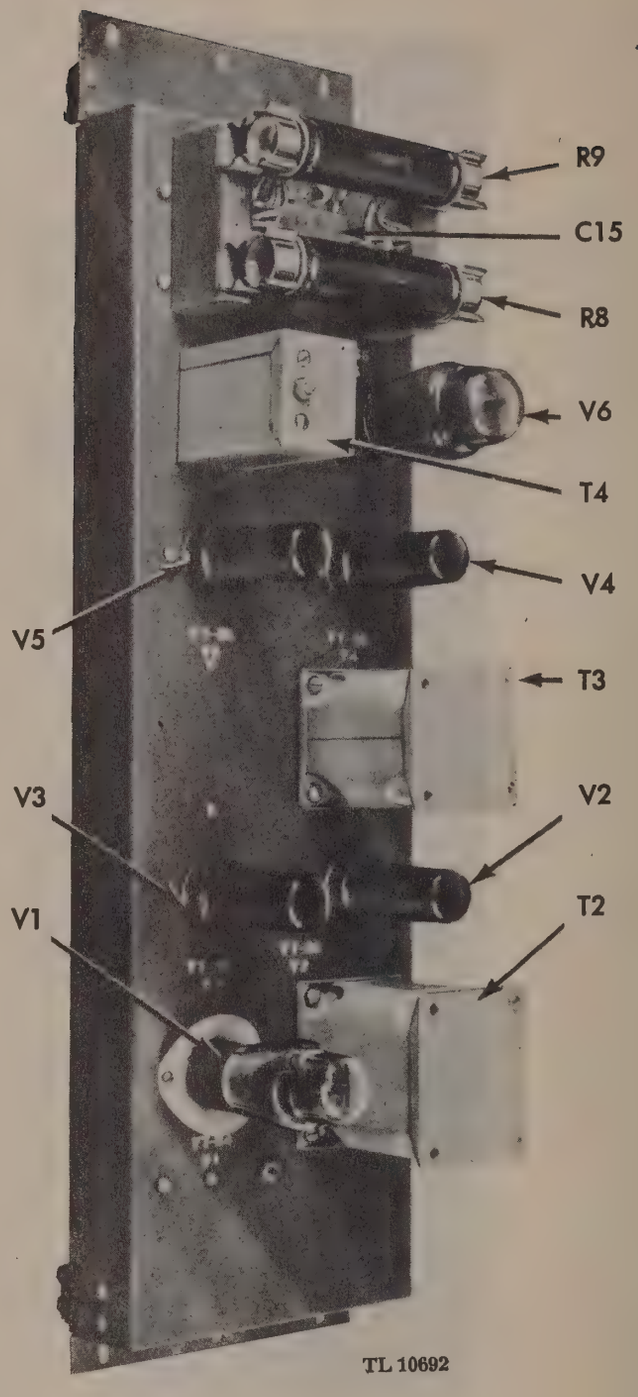


Figure 39. Audio unit, rear view.

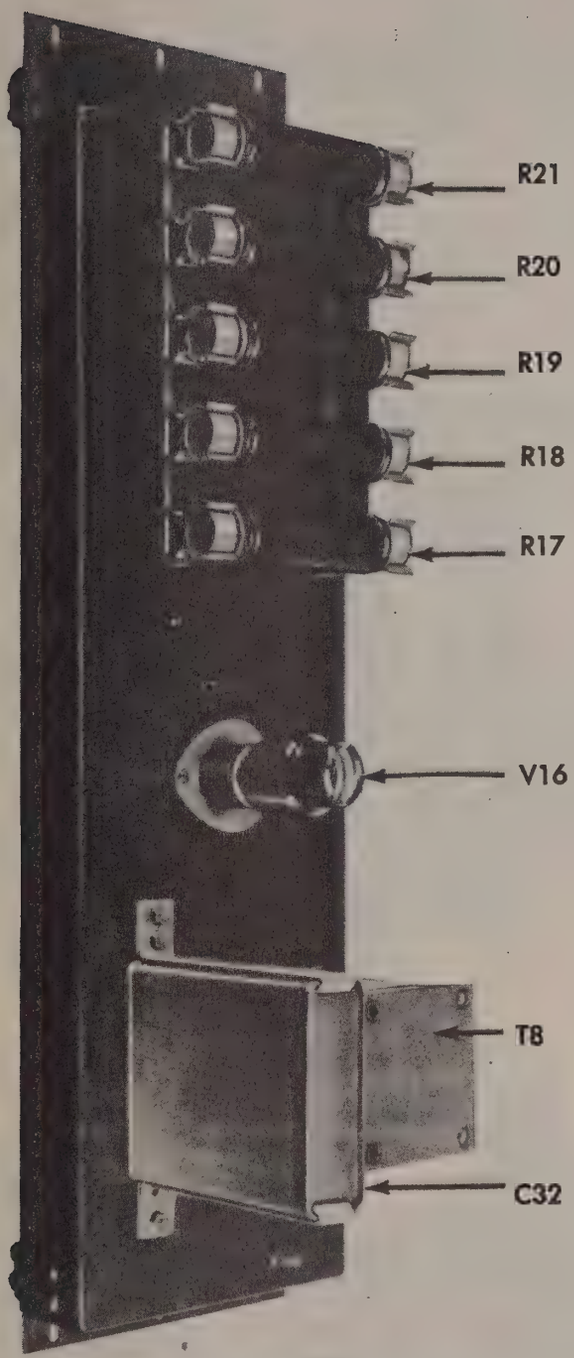


Figure 40. Bias and relay unit, rear view.

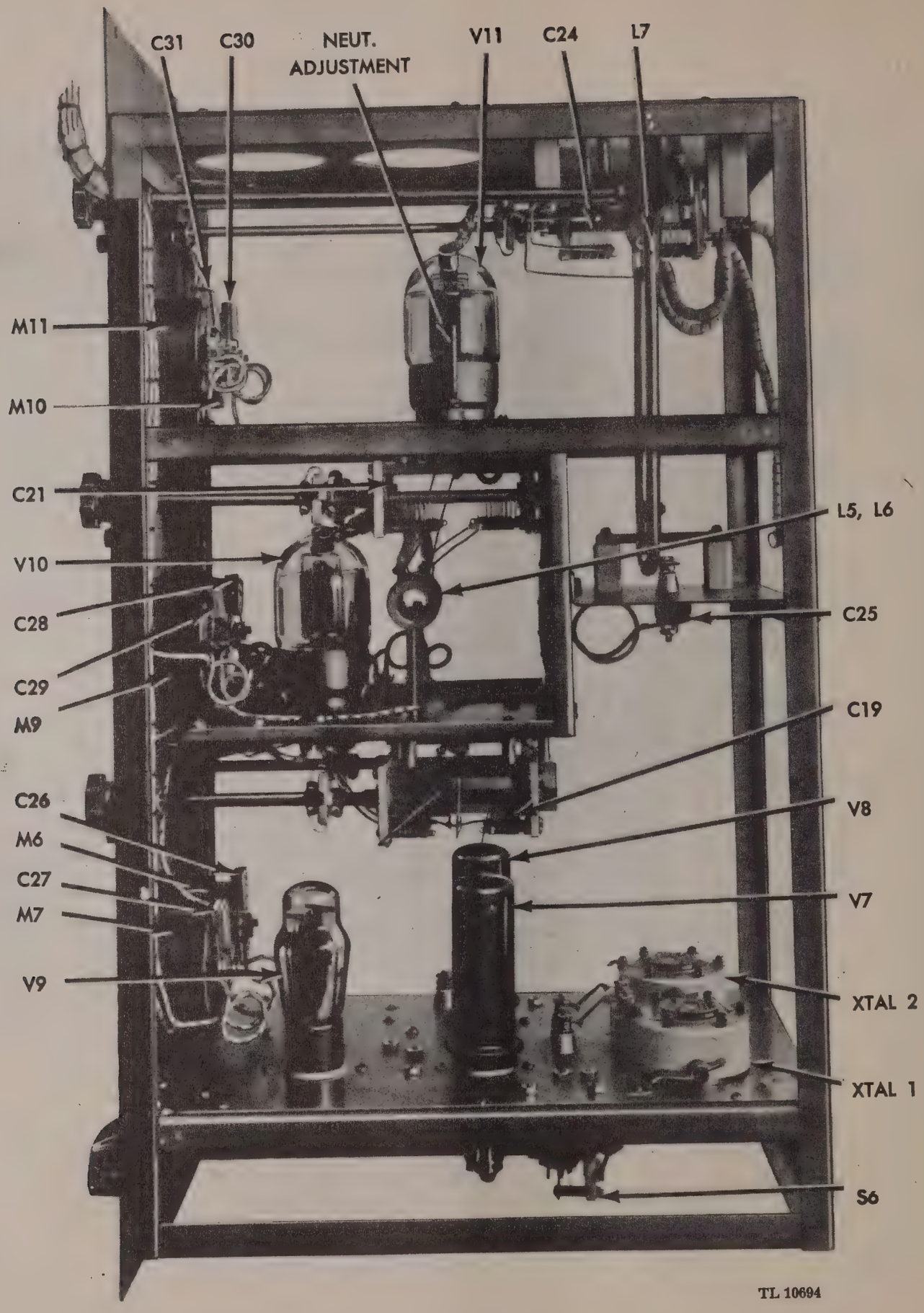


Figure 41. Radio-frequency unit, right-hand side.

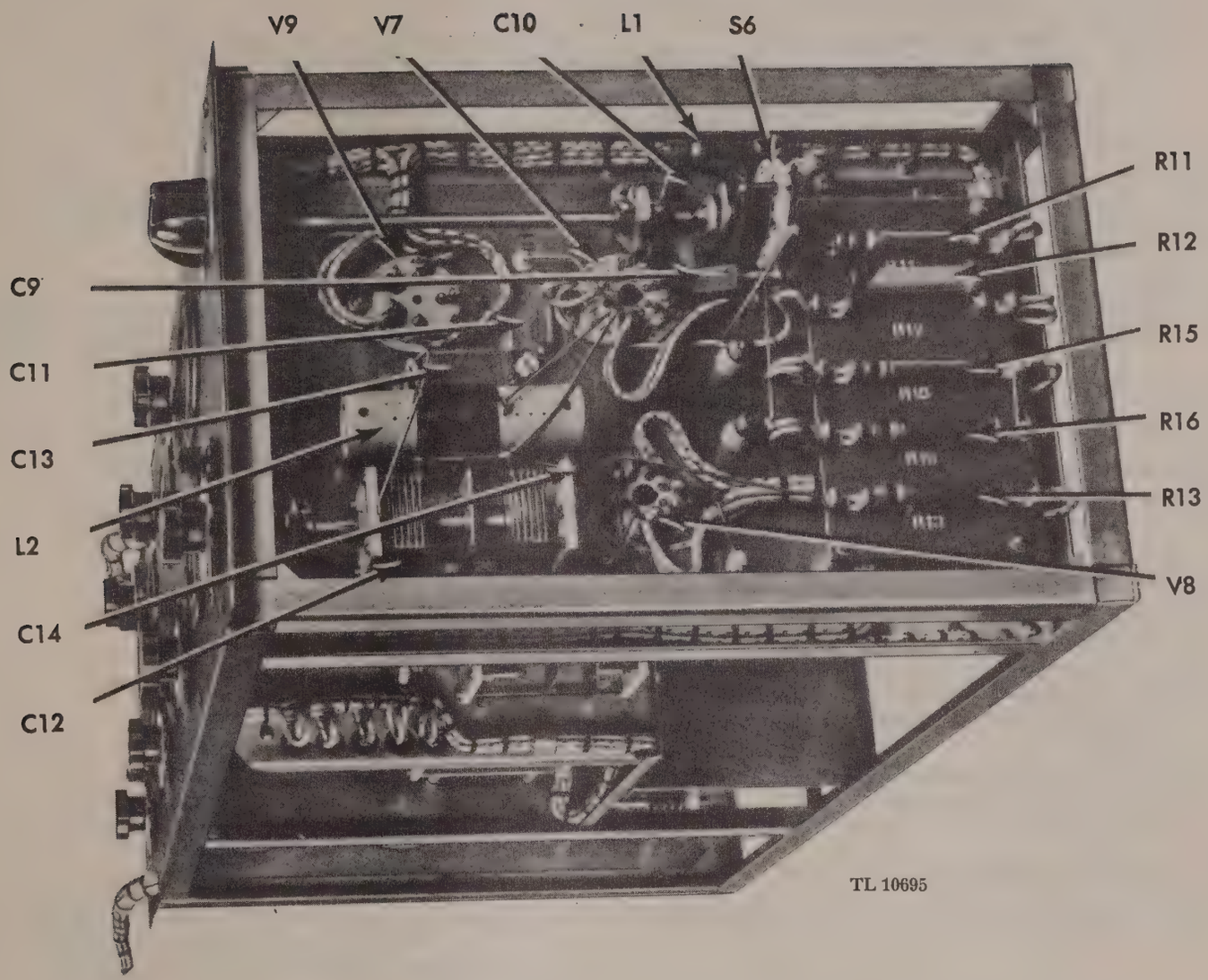


Figure 42. Radio-frequency unit, bottom view.

29. TROUBLE LOCATION AND REMEDY CHART

Possible Cause	Check and Remedy
a. A.C. LINE circuit breakers chatter.	
1. A.C. LINE voltage very low, less than 85 v.	Increase line voltage to at least 95 volts.
b. A.C. LINE pilot lamp does not light when the two A.C. LINE switches are ON.	
1. No a-c supply at terminals 8 and 9 (terminal board on base of transmitter, inside rear door).	Check a-c supply to transmitter.
2. Pilot lamp is dead. A.C. LINE meter reads 115 v.	Replace pilot lamp P1, P2, or P3, interchangeable.
3. Circuit breaker CB1 or CB2 is open.	
4. VOLTAGE REGULATOR SELECTOR SWITCH S2 is open.	Replace switch S2.
5. Voltage regulator VR1 has failed, or voltage regulator capacitors are shorted.	Replace VR1 and associated capacitors, or temporarily operate VOLTAGE REGULATOR SELECTOR SWITCH to OFF.
c. FILAMENT pilot lamp does not light when TRANS. FIL. switch is ON.	
1. Pilot lamp is dead. Tube heaters are on.	Replace pilot lamp.
2. Circuit breaker CB3 is open.	
d. PLATE voltage pilot lamp does not light when TRANS. PLATE switch is ON.	
1. Pilot lamp is dead. R.F. PLATE and A.F. PLATE meters read correctly.	Replace pilot lamp.
2. One of the doors is open or interlock safety switch S1, S3, or S4 is inoperative.	Close door or replace faulty switch.
3. Bias supply is not operating, hence bias relay E1 is not closed.	Check bias supply and correct.
4. Bias relay E1 is out of adjustment or is open.	Adjust relay E1 or replace.
5. Plate holding relay E2 is open.	Replace relay E2.
e. Bias relay E1 chatters.	
1. Direct short in r-f power supply or a-f power supply.	Turn VOLTAGE REGULATOR SELECTOR SWITCH to OUT. If TRANS. PLATE circuit breaker goes OFF, there is a plate circuit short. Locate the short and correct.
2. Bias relay E1 is out of adjustment.	Adjust relay E1.
f. R.F. PLATE meter does not indicate, although pilot lights are on.	
1. Meter M3 is open.	Replace meter M3.
2. Transformer T5 is inoperative.	Replace transformer T5.
3. Tubes V12 and/or V13 are inoperative.	Replace tubes.
4. Reactor X1 is open or shorted to ground.	Correct or replace.
5. Capacitor C1 or C6 is shorted.	Replace capacitor.
6. Secondary of modulation transformer T2 is shorted to ground.	Replace transformer T2.
7. TRANS. PLATE switch S5 is inoperative.	Replace switch S5.
8. Filament transformer T7 is inoperative.	Replace transformer T7.
g. A.F. PLATE meter does not indicate, although pilot lights are on.	
1. Meter M2 is open.	Replace meter M2.
2. Transformer T6 is inoperative.	Replace transformer T6.
3. Tubes V14 and/or V15 are inoperative.	Replace tubes.
4. Capacitor C2 or C5 is shorted.	Replace capacitor.
5. Reactor X2 is open or shorted to ground.	Correct or replace.
6. Transformer T2, T3, or T4 shorted to ground.	Replace transformer.
7. TRANS. PLATE switch S5 is inoperative.	Replace switch S5.
8. Filament transformer T7 is inoperative.	Replace transformer T7.

29. TROUBLE LOCATION AND REMEDY CHART (cont'd)

Possible Cause	Check and Remedy
h. Plate voltage does not go on because bias relay does not energize when TRANS. FIL. switch is ON.	
1. A door is open or an interlock safety switch S1, S3, or S4 is inoperative.	Close door or replace switch.
2. Bias supply transformer T8 or filament supply transformer T1 is inoperative.	Replace transformer.
3. Bias rectifier tube V16 or bias isolator tube V9 is inoperative.	Replace tube.
4. Capacitor C32 is shorted.	Replace capacitor C32.
5. Resistor R17 is open.	Replace resistor R17.
6. Bias relay E1 is open or contacts are out of adjustment.	Adjust contacts or replace relay E1.
7. Resistor R15 or R16 is shorted to ground.	Check for shorts in r-f unit.
i. MODULATION indicator does not indicate, although transmitter is on and MODULATION LEVEL control is in correct position.	
1. Fuse F1 is open. Most probable cause for fuse blowing is the cathode of meter rectifier tube V1 shorting to filament or ground.	Replace fuse after checking tube V1 for cathode short.
2. MODULATION meter calibrating resistor R4 may be open or out of adjustment.	To calibrate, use a negative peak indicator. Adjust the gain control for 100% modulation as indicated by the negative peak indicator, and then turn the slotted shaft on control R4 (on the r-f unit chassis; reach by opening left front door) until the MODULATION LEVEL indicator reads 100%. If a negative peak indicator is not available, set the MODULATION control to where an a-c voltage of 240 (approximately) appears across terminals 4 and 6 of modulation transformer T2. Then adjust resistor R4 until the MODULATION indicator reads 100%.
j. No modulation can be obtained and no audio voltage appears across terminals 4 and 6 on transformer T2. Audio unit does not deliver modulating voltage.	
1. If A.F. PLATE voltmeter reads 300 v (approx.), tubes in audio unit may be at fault.	Check tubes and replace if necessary.
2. If A.F. PLATE voltmeter reads low or zero, audio unit plate supply may be at fault.	Check audio unit plate supply and correct if necessary.
3. Six prong modulation-level control plug may not be securely in place in its socket on audio unit. Modulator stage may be at fault.	Check and correct if necessary.
(*a*) Primary of transformer T2 may be open.	Proceed as follows: (*a*) If MOD. PLATE meter does not read 80 ma (approx.) with MODULATION LEVEL control at 0, measure tubes V2 and V3 plate voltage. If primary of transformer T2 is open. Correct.
(*b*) Secondary of transformer T3 may be open.	(*b*) If MOD. PLATE meter reads 80 ma, advance MODULATION LEVEL control. If MOD. PLATE meter does not increase, transformer T3 secondary may be open. Check for continuity. Correct.
4. A-f driver stage may be at fault.	Proceed as follows:
(*a*) Transformer T3 primary may be open.	(*a*) Measure plate voltage on tube V4 and tube V5. If no voltage shows, transformer T3 primary may be open. Check for continuity. Correct.
(*b*) Tubes V4 or V5 may be faulty or resistor R5 may be open.	(*b*) Measure bias voltage across resistor R5. If not 7 v (approx.), tubes V4 or V5 may be open. Correct.
(*c*) Resistor R10 may be shorted or secondary of transformer T4 may be open.	(*c*) Measure the audio voltage between terminals 5 and 7 on A.F. oscillator transformer T4. If not 45 v (approx.), resistor R10 may be shorted or secondary of transformer T4 may be open. Correct.
5. A-f oscillator stage may be at fault.	Proceed as follows:
(*a*) Capacitors C3 or C4 or resistors R7 or R6 may be open or shorted.	(*a*) Measure voltages on tube V6. If not approximately correct, look for opens or shorts on capacitors C3, C4, resistors R7, and R6.

29. TROUBLE LOCATION AND REMEDY CHART (cont'd)

Possible Cause	Check and Remedy
k. 3,000 cycle tone adjustment.	
	This adjustment has been made for 3,000 cycles during manufacture before delivery. The small slotted screw on top of the a-f transformer T4 permeability-tunes the audio oscillator. The desired tone may be set by varying the screw setting with a beat-frequency oscillator, connected to the output of the audio unit.
l. No plate current dip is obtained on 2nd MULT. PLATE meter (tube V8), and no grid current is indicated on 3rd MULT. GRID meter.	
1. Oscillator-multiplier tube V7 defective.	Replace tube V7.
2. CRYSTAL SELECTOR SWITCH S6 not making contact.	Replace switch S6.
3. Crystal holder contacts not making good electrical contact.	Clean crystal holder contacts.
4. Crystal not oscillating.	Replace crystal.
m. 3rd MULT. GRID meter reads backwards.	
1. Internal short in 3rd multiplier tube V10. Probably between control grid and screen.	Replace tube V10.
2. Any external short between 3rd multiplier control grid and plate or screen circuit through tube V10 socket or wiring.	Check tube V10 socket and wiring and correct.
n. P.A. GRID meter reads backwards.	
1. Internal short between control grid and screen in P.A. tube V11.	Replace tube V11.
o. One or more of the four R.F. PLATE meters read off scale. Meters are OSC. MULT. PLATE, 2nd MULT. PLATE, 3rd MULT. PLATE, and P.A. PLATE.	
1. Plate bypass capacitor (for example, capacitor C18) may be shorted, allowing a high current (limited by plate dropping resistors—for example, resistor R19) to flow through the meter.	Measure the plate voltage of that stage. Replace any shorted capacitor.
2. The tube plate may be shorted to filament or cathode.	Replace the tube.
3. The socket may be shorted.	Replace the socket.
p. One or more of the four R.F. PLATE meters indicates less than normal plate current, although plate supply voltage is correct.	
1. Screen grid circuit may be grounded by short in screen bypass capacitor, tube or socket.	Find the short to ground and remove it.
2. Screen dropping resistor may be open.	Replace screen dropping resistor.
q. An r-f circuit (either plate or grid) does not resonate, although excitation is supplied.	
1. Wiper on tuning capacitor is not making contact with rotor.	Remove wiper and bend it apart, then reinsert so that spring action insures proper contact with rotor.

Section V

SUPPLEMENTARY DATA

30. MAINTENANCE PARTS LIST FOR RADIO TRANSMITTER BC-400-G

Ref. Symbol	Signal Corps Stock No.	Name of Part and Description	Quan. per Unit	Mfrs. Part and Code No.	Station Stock†	Region Stock†
	2C6380G	RADIO TRANSMITTER BC-400-G: 95 to 125 v, 60 cps, 75 megacycles.		BC-400-G (R5)		
C1, C2, C32	3DKA10-45	CAPACITOR: paper, oil; 10 mfd ± 10%; 600 v d-c working.	3	XLUC-6-10 (S5)	*	*
C3, C4	3DA35-1	CAPACITOR: mica, matched pair; 0.01 and 0.025 mfd, total 0.035 mfd, + 10% −5%; 600 v d-c working.	1	XQB (S5)		*
C5 thru C8, C26 thru C31	3DA5-8	CAPACITOR: mica; 0.005 mfd, 1,000 v d-c test.	10	MW (S5)	*	*
C9, C14	3DK9022-5	CAPACITOR: silver mica; 0.000022 mfd ± 2.5 mfd, 1,000 v d-c test.	2	MOS (S5)	*	*
C10	3DK9100-120	CAPACITOR: mica; 0.0001 mfd, 2,000 v d-c test.	1	MHB1016 (S5)		*
C11, C13, C16, C18, C20, C23, C25	3DKA1.500-12	CAPACITOR: mica; 0.0015 mfd, 2,000 v d-c test.	7	MHB1029 (S5)	*	*
C12, C17, C19	3D9035V-1.1	CAPACITOR: 2 section; variable, 35 mmfd each section.	3	ER-35-AD (C2)		
C15	3DA100-101.1	CAPACITOR: paper, oil; 0.1 × 0.1 mfd, +20% −10%; 1,000 v d-c working.	1	2XDMRW10-.1 (S5)		*
C21, C22, C24	3D9015V-15	CAPACITOR: 2 section; variable, 15 mmfd each section.	3	ET-15-AD (C2)		
L1	3C326-300.1	CHOKE: r-f; 1 millihenry.	1	R-300-U (N1)		*
X2	3C316-33	CHOKE: filter; 12 h, 210 ma.	1	T-46257 (T4)		*
X1	3C316-32	CHOKE: filter; 12 h, 275 ma.	1	T-46256 (T4)		*
L2	2C6380G/C3	COIL: r-f; 6.9 microhenries.	1	A-166-168-A (R5)		*
L7	2C6380H/C3	COIL: U shaped plumbing; ¼" OD, 23" long.	1	B-166-115A-1 (R5)		
L8	2C6380H/C4	COIL: U shaped plumbing; ¼" OD, 12⅜" long.	1	B-166-115A-2 (R5)		
XTAL1, XTAL2	2Z3524-4166.667	CRYSTAL AND HOLDER ASSEMBLY: crystal 4166.667 kc; holder is type FT-164.	2	(B14)		
F1	3Z2571	FUSE: 1/100 amp, 250 v, non-renewable.	1	1001 (L3)	*	*
IN1	3G1000-14	INSULATOR: ceramic, entrance cup.	4	1155 (A12)	*	*

† Parts not stocked in station or region stock are carried in depot stock.
* Indicates stock available.

30. MAINTENANCE PARTS LIST FOR RADIO TRANSMITTER BC-400-G (cont'd)

Ref. Symbol	Signal Corps Stock No.	Name of Part and Description	Quan. per Unit	Mfrs. Part and Code No.	Station Stock†	Region Stock†
P1, P2, P3	2Z5903	LAMP: 120 v, miniature.	3	S-6 (S19)	*	*
M1	3F8150-69	METER: 0-150 v a-c.	1	S#1203986 (W4) NA-33		*
M2, M3	3F8500-7	METER: 0-500 v d-c, 1,000 ohms per volt.	2	S#1203845 (W4) NX-33		*
M4	3FK930-15	METER: 0-300 ma d-c.	1	S#1203525 (W4) NX-33		*
M5	3F891-22	METER: 0-100 special scale; 0-1 ma, d-c.	1	S#1203503 (W4) NX-33		
M6 thru M9	3FK910-27	METER: 0-100 ma d-c.	4	S#1203521 (W4) NX-33	*	* *
M10	3FK901E5-4	METER: 0-15 ma d-c.	1	S#1203513 (W4) NX-33		*
M11	3FK915-27	METER: 0-150 ma d-c	1	S#1203522 (W4) NX-33		
CB1, CB2	3ZK9652-1.1	RELAY: circuit breaker; 4.6 amp, 115 v a-c.	2	0411 (4.6) (H6)	*	*
CB3	3H900-1.6	RELAY: circuit breaker; 1.6 amp, 115 v a-c.	1	0411 (1.6) (H6)	*	*
CB4	3H900-2.6	RELAY: circuit breaker; 2.6 amp, 115 v a-c.	1	0411 (2.6) (H6)		*
E1	2Z7587-11	RELAY: single pole, double throw; 2.03 v d-c; 300 ohm coil.	1	220C-34L (K5)		*
E2	2ZK763-21	RELAY: double pole, single throw; 48 v d-c; 1,550 ohm coil.	1	1254 (L2)		*
R1	3Z6694	RESISTOR: 9,400 ohm, 60 w, wire-wound.	1	Navy D (03)		*
R2	3Z6590-14	RESISTOR: 9,000 ohm, 60 w, wire-wound.	1	Navy D (03)		*
R3, R13, R15	3Z6650-7	RESISTOR: 50,000 ohm, 2 w, carbon.	3	BT-2 (I2)	*	*
R4	2Z7271-89	RESISTOR: potentiometer; 150,000 ohm, 2,000 v bushing.	1	37 (C10)		*
R5	3Z6050-21	RESISTOR: 500 ohm, 2 w, carbon.	1	BT-2 (I2)		*
R6	3Z6100-39	RESISTOR: 1,000 ohm, 2 w, carbon.	1	BT-2 (I2)		*
R7	3Z6300-42	RESISTOR: 3,000 ohm, 2 w, carbon.	1	BT-2 (I2)		*
R8	3ZK6610-97	RESISTOR: 10,000 ohm, 60 w, wire-wound.	1	Navy D (03)		*
R9	3Z6150-95	RESISTOR: 1,500 ohm, 60 w, wire-wound.	1	Navy D (03)		*
R10	2ZK7276.34	RESISTOR: potentiometer; 500,000 ohm, dual control.	1	37-D (C10)		*
R11	3Z6620-48	RESISTOR: 200,000 ohm, 2 w, carbon.	1	BT-2 (I2)		*
R12	3Z6635-12	RESISTOR: 35,000 ohm, 3 w, carbon.	1	(S24)		*
R16	3Z6620-12	RESISTOR: 20,000 ohm, 2 w, carbon.	1	BT-2 (I2)		*

30. MAINTENANCE PARTS LIST FOR RADIO TRANSMITTER BC-400-G (cont'd)

Ref. Symbol	Signal Corps Stock No.	Name of Part and Description	Quan. per Unit	Mfrs. Part and Code No.	Station Stock†	Region Stock†
R17	3Z6612A5-8	RESISTOR: 12,500 ohm, 60 w, wire-wound.	1	Navy D (03)		*
R18	3Z6500-171	RESISTOR: 5,000 ohm, 60 w, wire-wound.	1	Navy D (03)		*
R19	3Z6300-156	RESISTOR: 3,000 ohm, 60 w, wire-wound.	1	Navy D (03)		*
R20	3Z6617E5-3	RESISTOR, 17,500 ohm, 60 w, wire-wound.	1	Navy D (03)		*
R21	3Z6625-131	RESITOR: 2,500 ohm, 60 w, wire-wound.	1	Navy D (03)		*
SO1	2Z8757.3	SOCKET: tube, 4 prong, steatite.	4	CIR-4 (N1)	*	*
SO2	2Z8711	SOCKET: tube, 5 prong, steatite.	3	CIR-5 (N1)	*	*
SO3	2Z8078.119	SOCKET: tube, 8 prong, steatite.	9	CIR-8E (N1)	*	*
S1, S3, S4	3Z9561	SWITCH: single pole, single throw.	3	YZ-RL-8 (M3)	*	*
S2	3ZK9862-1.1	SWITCH: double pole, double throw.	1	8660 (A17)		*
S5	3Z9837-5	SWITCH: rotary, 2 single poles, 4 position.	1	111T2-4 (03)		*
S6	3ZK9825-58.5	SWITCH: rotary, double pole, double throw; 2 position, nonshorting.	1	H (C4)		*
T1	2Z9611.58	TRANSFORMER: filament; primary: 115 v, 60 cps; secondary: 6.4 v, 10 amp.	1	T-46248 (T4)		*
T2	2Z9634.18	TRANSFORMER: modulation; primary: push-pull parallel, Class B 6N7; secondary: 8,000 ohm.	1	T-46255 (T4)		*
T3	2ZK9717-46254	TRANSFORMER: audio-driver; primary: push-pull parallel, Class A 6N7; secondary: push-pull parallel, Class B 6N7.	1	T-46254 (T4)		*
T4	2ZK9717-46253	TRANSFORMER: input, output to push-pull parallel; Class A 6N7.	1	T-46253 (T4)		*
T5	2Z9613.61	TRANSFORMER: plate; primary: 115 v, 60 cps; secondary: 950 v center tapped, 275 ma.	1	T-46250 (T4)		*
T6	2Z9613.62	TRANSFORMER: plate; primary: 115 v, 60 cps; secondary: 770 v center tapped, 200 ma.	1	T-46251 (T4)		*
T7	2Z9611.59	TRANSFORMER: filament; primary: 115 v, 60 cps; secondary 1: 5 v center tapped, 6 amp; secondary 2: 5 v center tapped, 6 amp.	1	T-46249 (T4)		*
T8	2Z9613.63	TRANSFORMER: plate; primary: 115 v; secondary: 905 v center tapped, 30 ma.	1	T-46252 (T4)		*
L3, L4	2C6380G/C1	TRANSFORMER ASSEMBLY: primary and secondary wound on same coil.	1	A-166-169 (R5)		*
L5, L6	2C6380G/C2	TRANSFORMER ASSEMBLY: primary and secondary on one coil.	1	A-166-170 (R5)		*

30. MAINTENANCE PARTS LIST FOR RADIO TRANSMITTER BC-400-G (cont'd)

Ref. Symbol	Signal Corps Stock No.	Name of Part and Description	Quan. per Unit	Mfrs. Part and Code No.	Station Stock†	Region Stock†
V1, V9, V16	2J84	TUBE: JAN-84.	3	84 (R2)	*	*
V2, V3, V4	2J6N7	TUBE: JAN-6N7.	3	6N7 (R2)	*	*
V6	2J6F6	TUBE: JAN-6F6.	1	6F6 (R2)	*	*
V7, V8	2J6L6	TUBE: JAN-6L6.	2	6L6 (R2)	*	*
V10, V11	2J815	TUBE: JAN-815.	2	815 (R2)	*	*
V12 thru V15	2J5Z3	TUBE: JAN-5Z3.	4	5Z3 (R2)	*	*
VR1	2Z9957-19	VOLTAGE REGULATOR: primary: 95/125 v, 60 cps; secondary: 115 v, 60 cps, includes 2 paper, oil; 8 mfd, 600 v, 60 cps capacitors.	1	T-46247 (T4)		

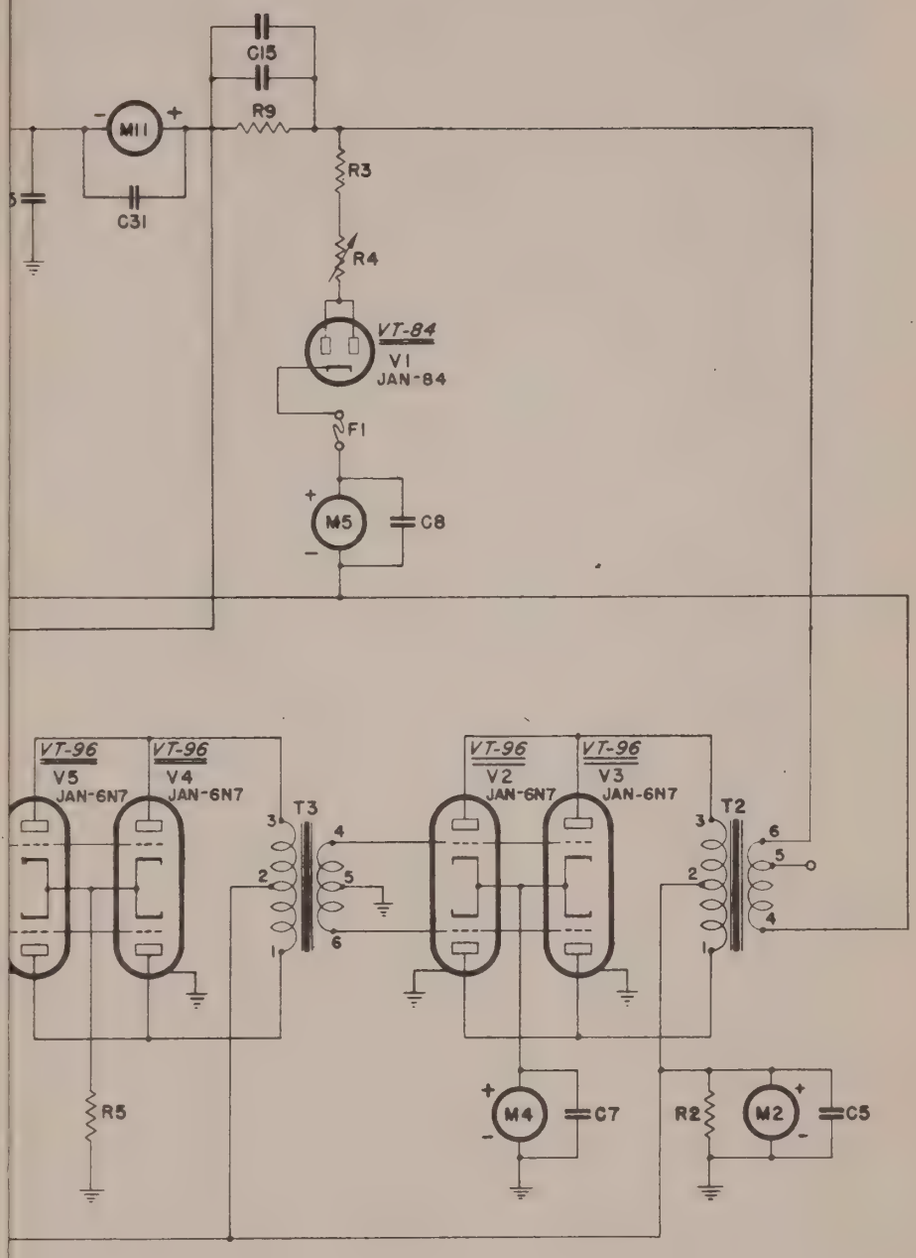
† Parts not stocked in station or region stock are carried in depot stock.
* Indicates stock available.

31. LIST OF MANUFACTURERS

Code	Manufacturer's Name
A12	American Lava Corp.
A17	Arrow-Hart & Hegeman Co.
B14	Bliley Electric Co.
C2	Allen D. Cardwell Mfg. Corp.
C4	Centralab.
C10	Clarostat Mfg. Co., Inc.
H6	Heinemann Circuit Breaker Co.
I2	International Resistance Co.
K5	Kurman Electric Co.
L2	Leach Relay Co.
L3	Littelfuse Lab.
M3	Micro Switch Corp.
N1	National Co.
O3	Onan, D. W. & Sons.
R2	RCA Mfg. Co.
R5	Radio Receptor Co., Inc.
S5	Solar Mfg. Corp.
S19	Sylvania Electric Products, Inc.
S24	Stackpole CarbonCo.
T4	Thordarson Electric Mfg. Co.
W4	Westinghouse Electric & Mfg. Co.

CAPACITORS

C1	R-f power supply filter (10 mfd, 600 v d-c working)
C2	A-f power supply filter (10 mfd, 600 v d-c working)
C3	A-f oscillator tuning, matched pair (10,000 mmfd, 600 v d-c working)
C4	A-f oscillator tuning, matched pair (25,000 mmfd, 600 v d-c working)
C5	Meter M2 bypass (5,000 mmfd, 500 v d-c working)
C6	Meter M3 bypass (5,000 mmfd, 500 v d-c working)
C7	Meter M4 bypass (5,000 mmfd, 500 v d-c working)
C8	Meter M5 bypass (5,000 mmfd, 500 v d-c working)
C9	Oscillator-multiplier feed-back (22 mmfd, 500 v d-c working)
C10	Oscillator-multiplier cathode reactance (100 mmfd, 1,000 v d-c working)
C11	Oscillator-multiplier screen bypass (1,500 mmfd, 1,000 v d-c working)
C12	Oscillator-multiplier plate tuning (35 mmfd, per section, dual, variable)
C13	Oscillator-multiplier plate bypass (1,500 mmfd, 1,000 v d-c working)
C14	2nd multiplier grid coupling (22 mmfd, 500 v d-c working)
C15	Resistor R9 a-f shunt (0.01 mfd, dual 1,000 v d-c working)
C16	2nd multiplier screen bypass (1,500 mmfd, 1,000 v d-c working)
C17	2nd multiplier plate tuning (35 mmfd, per section, dual, variable)
C18	2nd multiplier plate bypass (1,500 mmfd, 1,000 v d-c working)
C19	3rd multiplier grid tuning (35 mmfd, per section, dual, variable)
C20	3rd multiplier screen bypass (1,500 mmfd, 1,000 v d-c working)
C21	3rd multiplier plate tuning (3-15 mmfd, per section, dual, variable)
C22	P-a grid tuning (3-15 mmfd, per section, dual, variable)
C23	P-a screen bypass (1,500 mmfd, 1,000 v d-c working)
C24	P-a screen bypass (3-15 mmfd per section, dual, variable)
C25	P-a plate bypass (1,500 mmfd, 1,000 v d-c working)
C26	Meter M6 bypass (5,000 mmfd, 500 v d-c working)
C27	Meter M7 bypass (5,000 mmfd, 500 v d-c working)
C28	Meter M8 bypass (5,000 mmfd, 500 v d-c working)



OF TUBES

Figure 43. Radio Transmitter BC-400-G, schematic diagram.

30. MAINTENANCE PARTS LIST FOR RADIO TRANSMITTER BC-400-G (cont'd)

Ref. Symbol	Signal Corps Stock No.	Name of Part and Description	Quan. per Unit	Mfrs. Part and Code No.	Station Stock†	Region Stock†
V1, V9, V16	2J84	TUBE: JAN-84.	3	84 (R2)	*	*
V2, V3, V4	2J6N7	TUBE: JAN-6N7.	3	6N7 (R2)	*	*
V6	2J6F6	TUBE: JAN-6F6.	1	6F6 (R2)	*	*
V7, V8	2J6L6	TUBE: JAN-6L6.	2	6L6 (R2)	*	*
V10, V11	2J815	TUBE: JAN-815.	2	815 (R2)	*	*
V12 thru V15	2J5Z3	TUBE: JAN-5Z3.	4	5Z3 (R2)	*	*
VR1	2Z9957-19	VOLTAGE REGULATOR: primary: 95/125 v, 60 cps; secondary: 115 v, 60 cps, includes 2 paper, oil; 8 mfd, 600 v, 60 cps capacitors.	1	T-46247 (T4)		

† Parts not stocked in station or region stock are carried in depot stock.
* Indicates stock available.

31. LIST OF MANUFACTURERS

Code	Manufacturer's Name
A12	American Lava Corp.
A17	Arrow-Hart & Hegeman Co.
B14	Bliley Electric Co.
C2	Allen D. Cardwell Mfg. Corp.
C4	Centralab.
C10	Clarostat Mfg. Co., Inc.
H6	Heinemann Circuit Breaker Co.
I2	International Resistance Co.
K5	Kurman Electric Co.
L2	Leach Relay Co.
L3	Littelfuse Lab.
M3	Micro Switch Corp.
N1	National Co.
O3	Onan, D. W. & Sons.
R2	RCA Mfg. Co.
R5	Radio Receptor Co., Inc.
S5	Solar Mfg. Corp.
S19	Sylvania Electric Products, Inc.
S24	Stackpole CarbonCo.
T4	Thordarson Electric Mfg. Co.
W4	Westinghouse Electric & Mfg. Co.

FUNCTIONS AND ELECTRICAL VALUES OF PARTS

CAPACITORS

- C1 R-f power supply filter (10 mfd, 600 v d-c working)
- C2 A-f power supply filter (10 mfd, 600 v d-c working)
- C3 A-f oscillator tuning, matched pair (10,000 mmfd, 600 v d-c working)
- C4 A-f oscillator tuning, matched pair (25,000 mmfd, 600 v d-c working)
- C5 Meter M2 bypass (5,000 mmfd, 500 v d-c working)
- C6 Meter M3 bypass (5,000 mmfd, 500 v d-c working)
- C7 Meter M4 bypass (5,000 mmfd, 500 v d-c working)
- C8 Meter M5 bypass (5,000 mmfd, 500 v d-c working)
- C9 Oscillator-multiplier feed-back (22 mmfd, 500 v d-c working)
- C10 Oscillator-multiplier cathode reactance (100 mmfd, 1,000 v d-c working)
- C11 Oscillator-multiplier screen bypass (1,500 mmfd, 1,000 v d-c working)
- C12 Oscillator-multiplier plate tuning (35 mmfd, per section, dual, variable)
- C13 Oscillator-multiplier plate bypass (1,500 mmfd, 1,000 v d-c working)
- C14 2nd multiplier grid coupling (22 mmfd, 500 v d-c working)
- C15 Resistor R9 a-f shunt (0.01 mfd, dual 1,000 v d-c working)
- C16 2nd multiplier screen bypass (1,500 mmfd, 1,000 v d-c working)
- C17 2nd multiplier plate tuning (35 mmfd, per section, dual, variable)
- C18 2nd multiplier plate bypass (1,500 mmfd, 1,000 v d-c working)
- C19 3rd multiplier grid tuning (35 mmfd, per section, dual, variable)
- C20 3rd multiplier screen bypass (1,500 mmfd, 1,000 v d-c working)
- C21 3rd multiplier plate tuning (3-15 mmfd, per section, dual, variable)
- C22 P-a grid tuning (3-15 mmfd, per section, dual, variable)
- C23 P-a screen bypass (1,500 mmfd, 1,000 v d-c working)
- C24 P-a screen bypass (3-15 mmfd per section, dual, variable)
- C25 P-a plate bypass (1,500 mmfd, 1,000 v d-c working)
- C26 Meter M6 bypass (5,000 mmfd, 500 v d-c working)
- C27 Meter M7 bypass (5,000 mmfd, 500 v d-c working)
- C28 Meter M8 bypass (5,000 mmfd, 500 v d-c working)

CAPACITORS (cont'd)

- C29 Meter M9 bypass (5,000 mmfd, 500 v d-c working)
- C30 Meter M10 bypass (5,000 mmfd, 500 v d-c working)
- C31 Meter M11 bypass (5,000 mmfd, 500 v d-c working)
- C32 Bias filter (10 mfd, 600 v d-c working)

COND

- VR1 Part of voltage regulator VR1

CIRCUIT BREAKERS

- CB1 A-c line (4.6 amp, 120 v)
- CB2 A-c line (4.6 amp, 120 v)
- CB3 Filament and bias supply (1.6 amp, 120 v)
- CB4 Plate overload (2.6 amp, 120 v)

COILS

- L1 Oscillator-multiplier cathode choke (1 millihenry)
- L2 Oscillator-multiplier plate tuning
- L3 2nd multiplier plate tuning
- L4 3rd multiplier grid tuning
- L5 3rd multiplier plate tuning
- L6 P-a grid tuning
- L7 P-a plate tuning
- L8 Output coupling
- X1 R-f high voltage filter (12h)
- X2 A-f high voltage filter (12h)

CRYSTALS

- XTAL1 Frequency control (4166.667 kc)
- XTAL2 Frequency control (4166.667 kc)

FUSE

- F1 Meter M5 protection (1-100 amp)

METERS

- M1 A-c line voltage (0-150 v a-c)
- M2 A-f plate voltage (0-500 v d-c)
- M3 R-f plate voltage (0-500 v d-c)
- M4 Modulation plate current (0-300 ma d-c)
- M5 Modulation (0-1 ma d-c)
- M6 Oscillator-multiplier plate current (0-100 ma d-c)
- M7 2nd multiplier plate current (0-100 ma d-c)
- M8 3rd multiplier grid current (0-100 ma d-c)
- M9 3rd multiplier plate current (0-100 ma d-c)
- M10 P-a grid current (0-15 ma d-c)
- M11 P-a plate current (0-150 ma d-c)

POTENTIOMETERS

- R4 Modulation meter M5 calibration (150,000 ohms)
- R10 Modulation level control (500,000 ohms, dual)

RECEPTACLES

- P1 A-c line pilot
- P2 Filament pilot
- P3 Plate pilot

RELAYS

- E1 Bias interlock control
- E2 Bias interlock plate

RESISTORS

- R1 R-f power supply bleeder (9,400 ohms, 60 w)
- R2 R-f power supply bleeder (9,000 ohms, 60 w)

RESISTORS (cont'd)

- R3 Meter M5 multiplier (50,000 ohms, 2 w)
- R5 Audio driver cathode (500 ohms, 2 w)
- R6 Audio oscillator grid (1,000 ohms, 2 w)
- R7 Audio oscillator cathode (3,000 ohms, 2 w)
- R8 P-a screen dropping (10,000 ohms, 60 w)
- R9 P-a plate dropping (1,500 ohms, 60 w)
- R11 Oscillator-multiplier grid (200,000 ohms, 2 w)
- R12 Oscillator-multiplier screen dropping (35,000 ohms, 3 w)
- R13 2nd multiplier grid (50,000 ohms, 2 w)
- R14 Not used
- R15 3rd multiplier grid (50,000 ohms, 2 w)
- R16 P-a grid (20,000 ohms, 2 w)
- R17 Bias dropping (12,500 ohms, 60 w)
- R18 Oscillator-multiplier plate dropping (5,000 ohms, 60 w)
- R19 2nd multiplier plate dropping (3,000 ohms, 60 w)
- R20 2nd and 3rd multiplier screen dropping (17,500 ohms, 60 w)
- R21 3rd multiplier plate dropping (2,500 ohms, 60 w)

SWITCHES

- S1 Rear door safety interlock
- S2 Voltage regulator selector
- S3 Front left door safety interlock
- S4 Front right door safety interlock
- S5 Plate voltage control
- S6 Crystal selector

TRANSFORMERS

- T1 R-f and a-f heaters
- T2 Modulation
- T3 Audio driver
- T4 Audio osaillator and output
- T5 R-f high voltage plate
- T6 A-f high voltage plate
- T7 High voltage rectifier filament
- T8 Bias rectifier plate

TUBES

- V1 Modulation meter rectifier
- V2 Modulator
- V3 Modulator
- V4 Audio driver
- V5 Audio driver
- V6 Audio oscillator
- V7 R-f oscillator multiplier
- V8 2nd multiplier
- V9 Bias isolator
- V10 3rd multiplier
- V11 Power amplifier
- V12 R-f high voltage rectifier
- V13 R-f high voltage rectifier
- V14 A-f high voltage rectifier
- V15 A-f high voltage rectifier
- V16 Bias rectifier

VOLTAGE REGULATOR

- VR1 A-c line

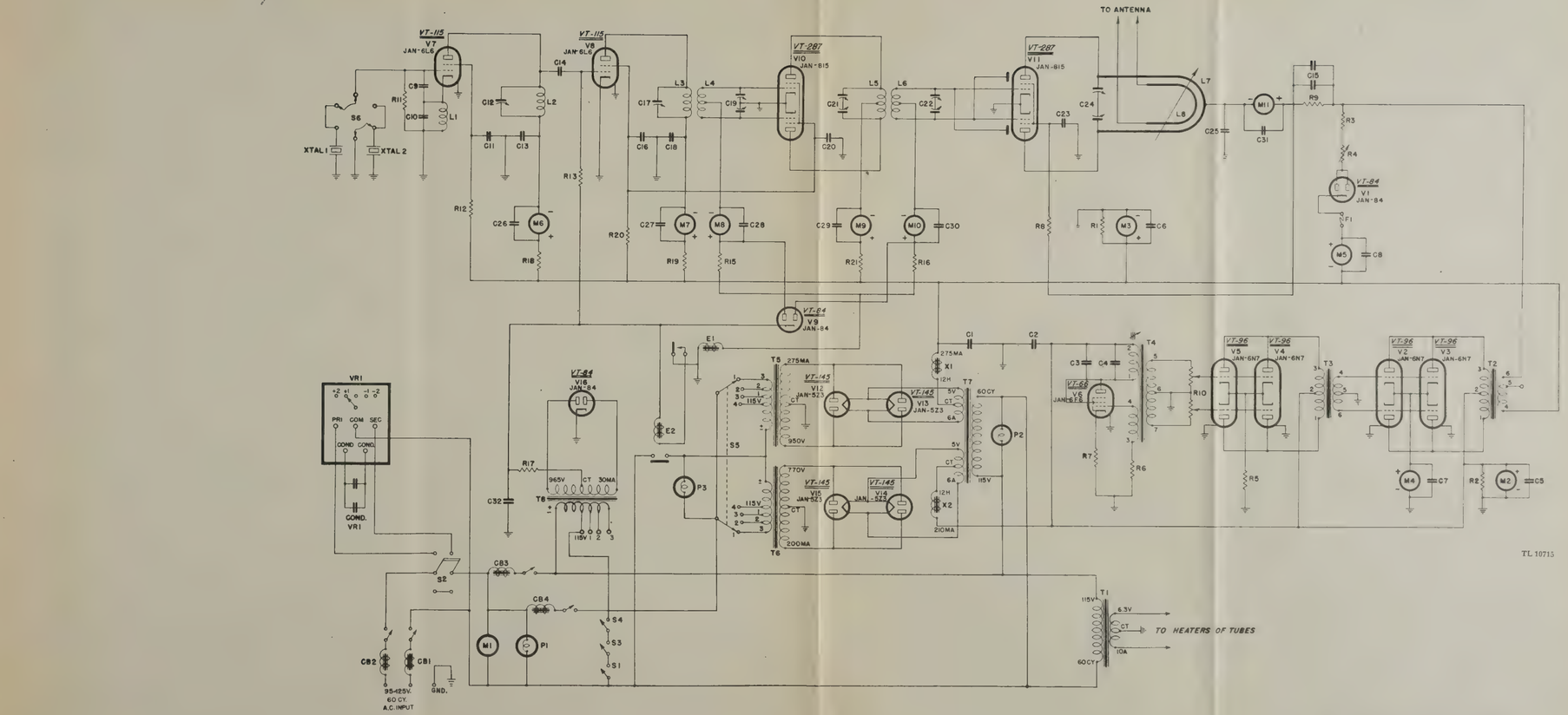


Figure 43. Radio Transmitter BC-400-G, schematic diagram.

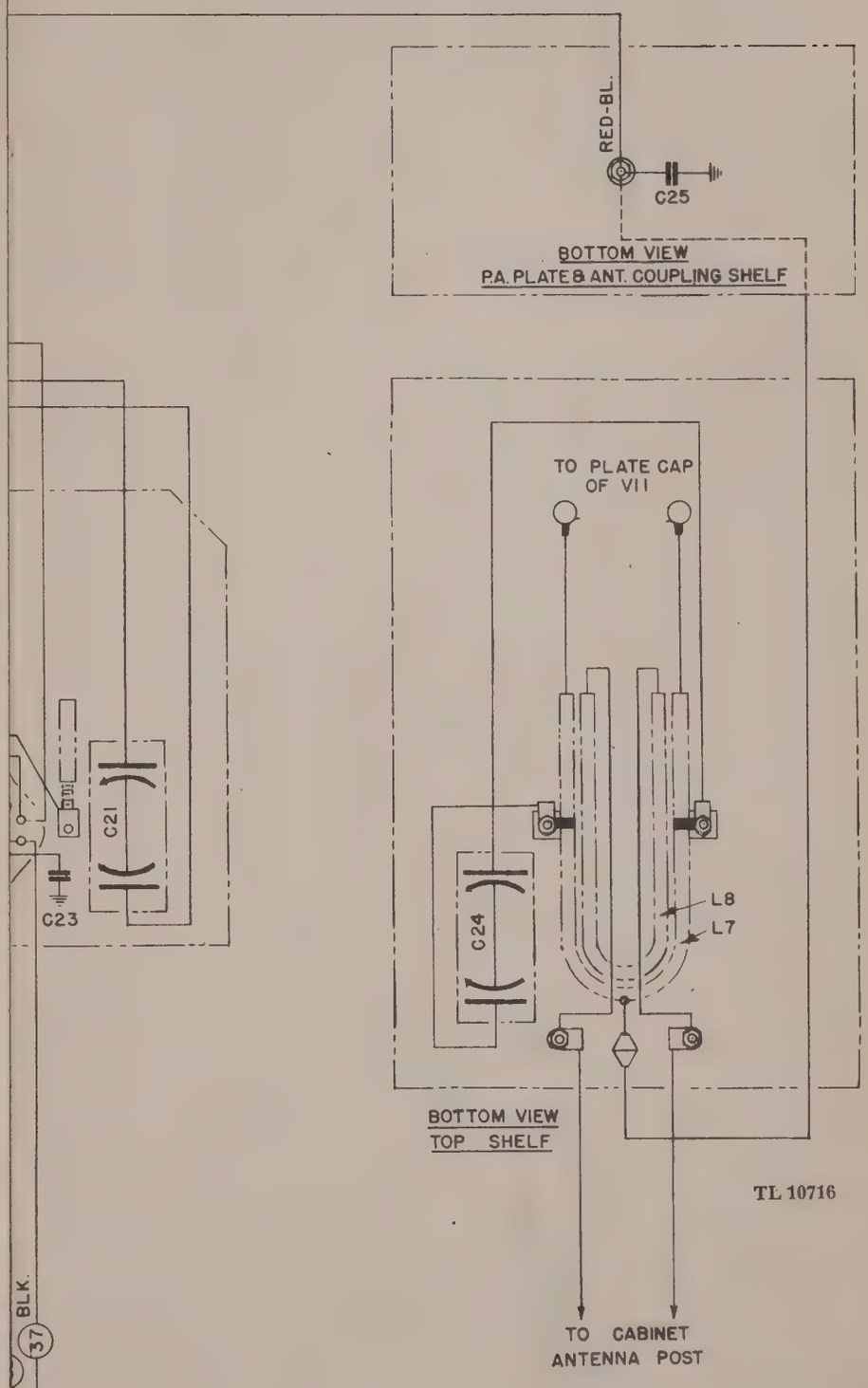


Figure 44. Radio-frequency unit, wiring diagram.

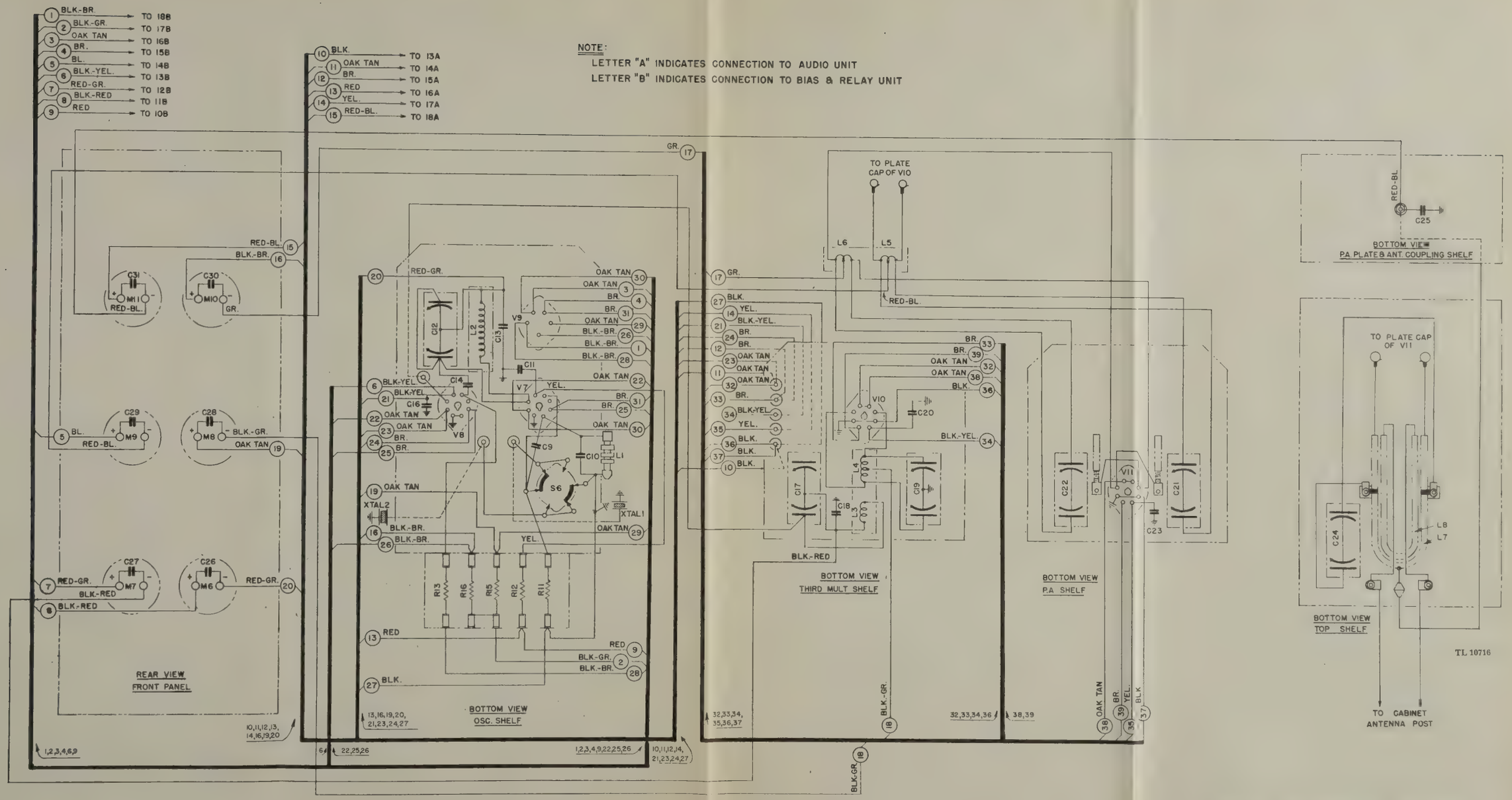


Figure 44. Radio-frequency unit, wiring diagram.

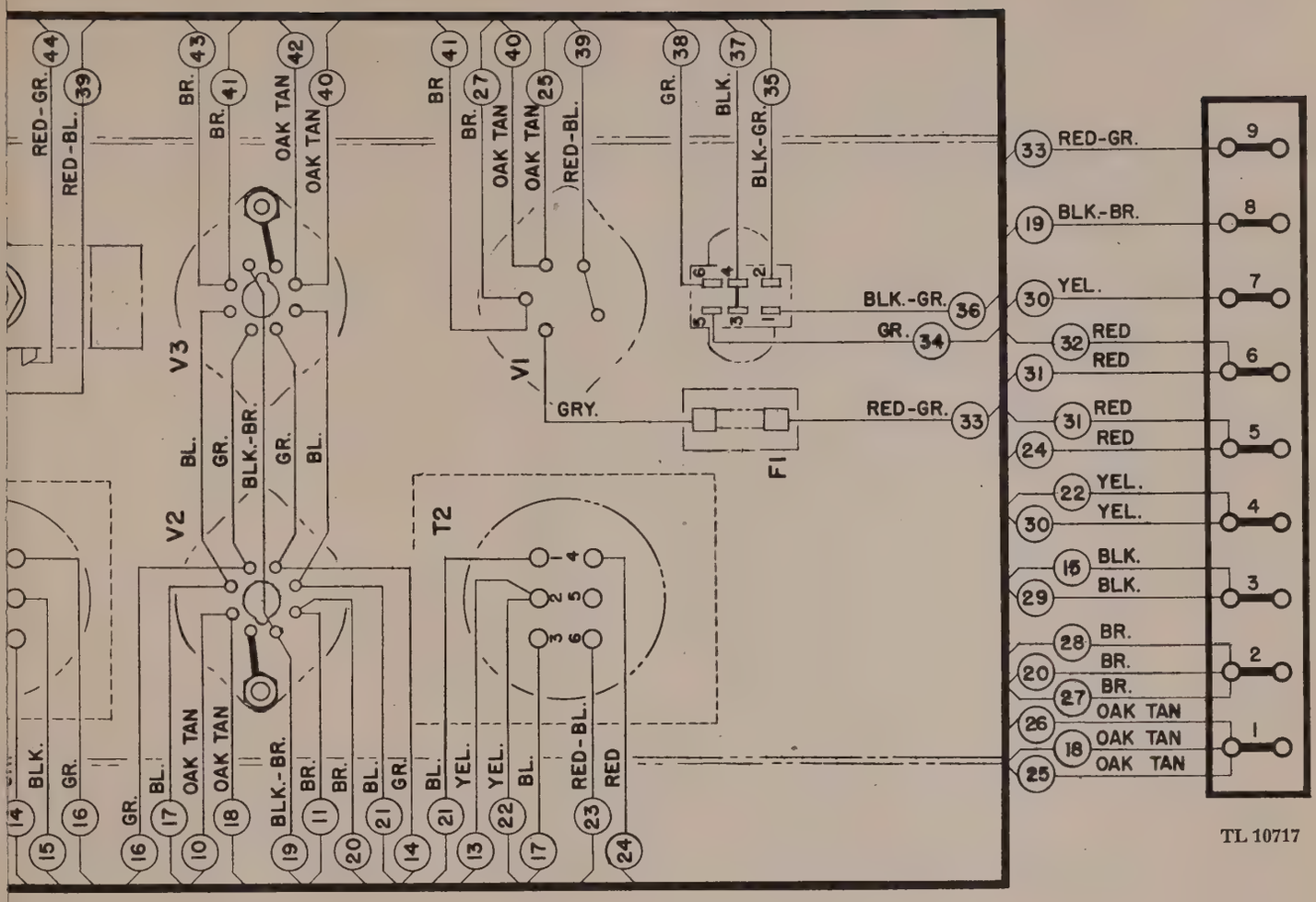


Figure 45. Audio unit, wiring diagram.

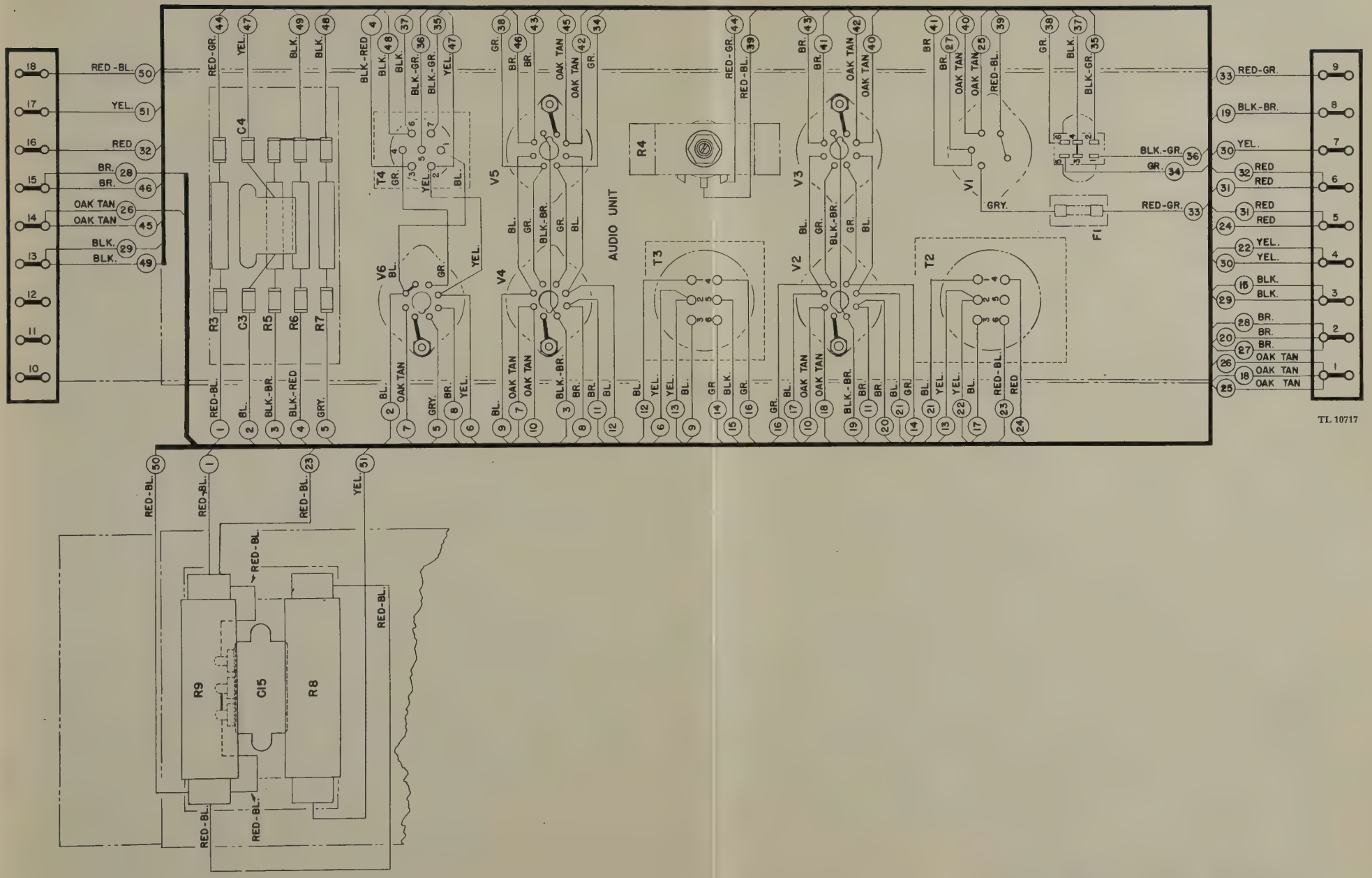


Figure 45. Audio unit, wiring diagram.

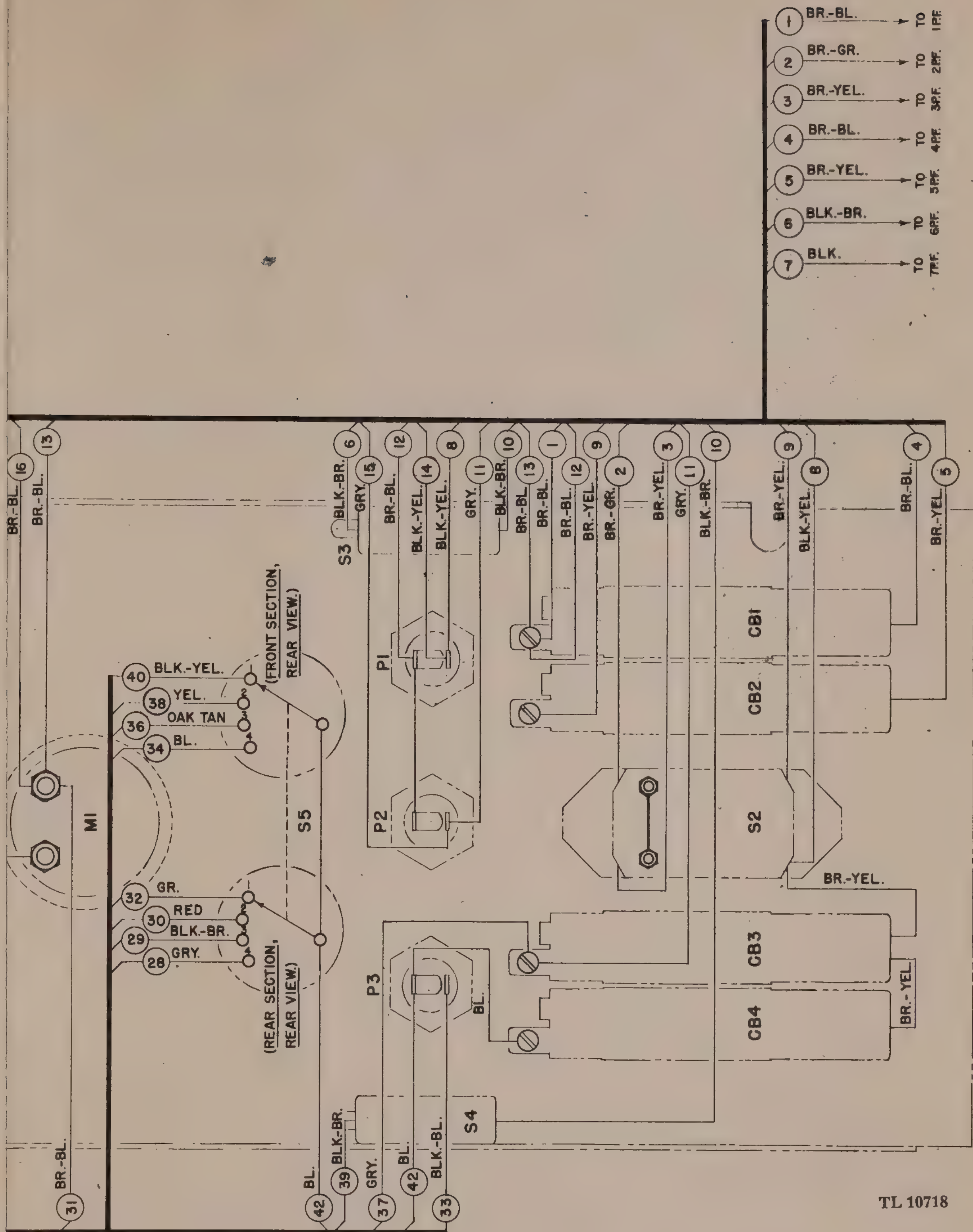


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Figure 46. Control unit, wiring diagram.

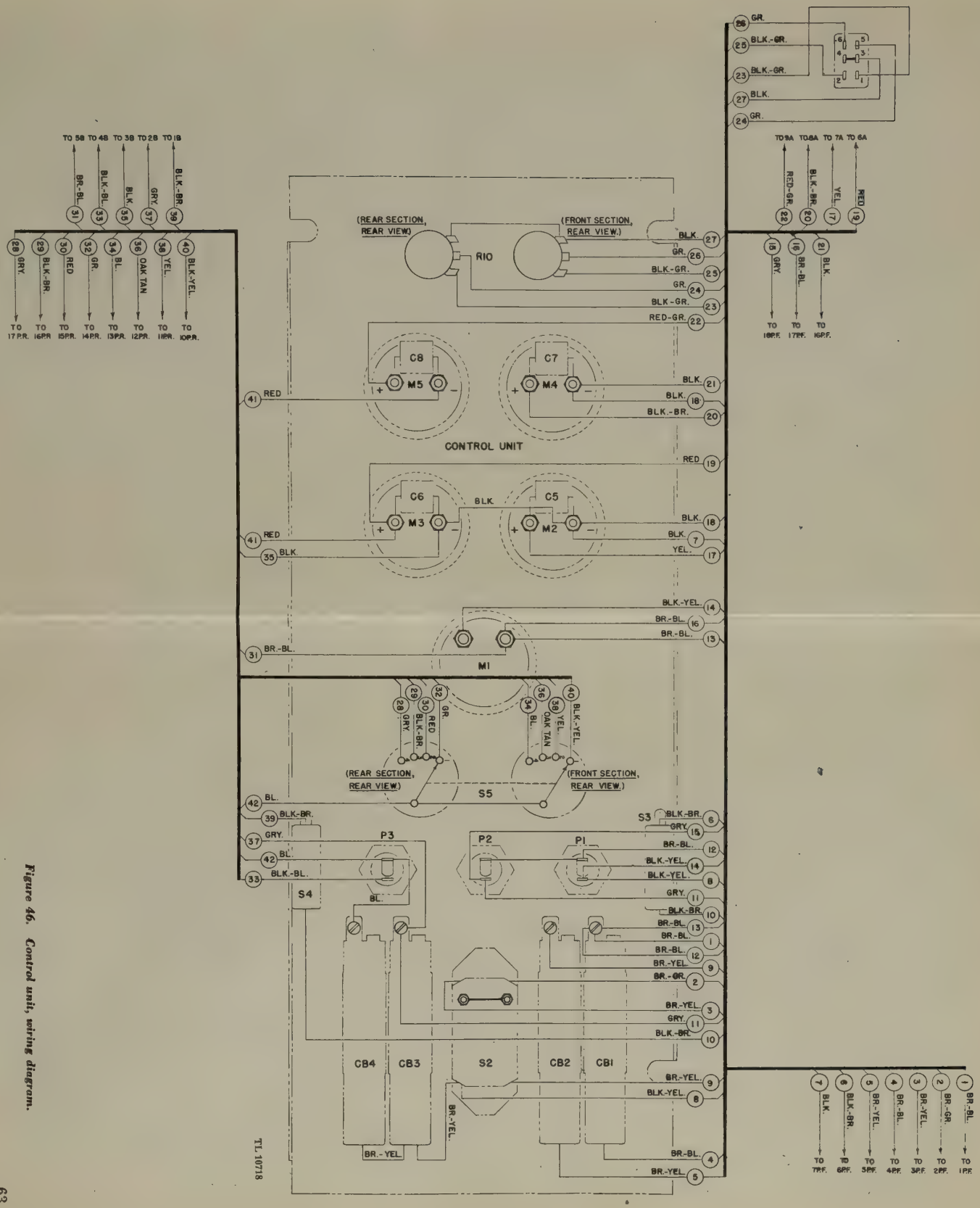

Figure 46. Control unit, wiring diagram.

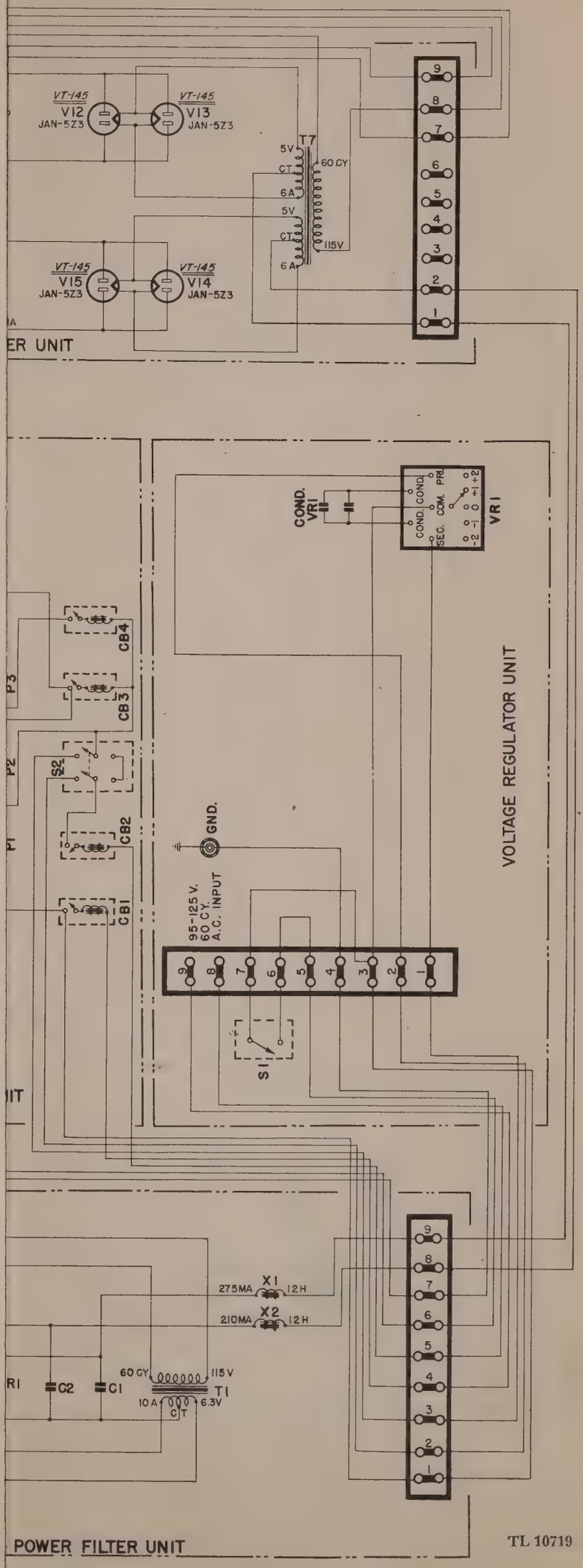

Figure 47. Radio Transmitter BC-400-G, wiring diagram.

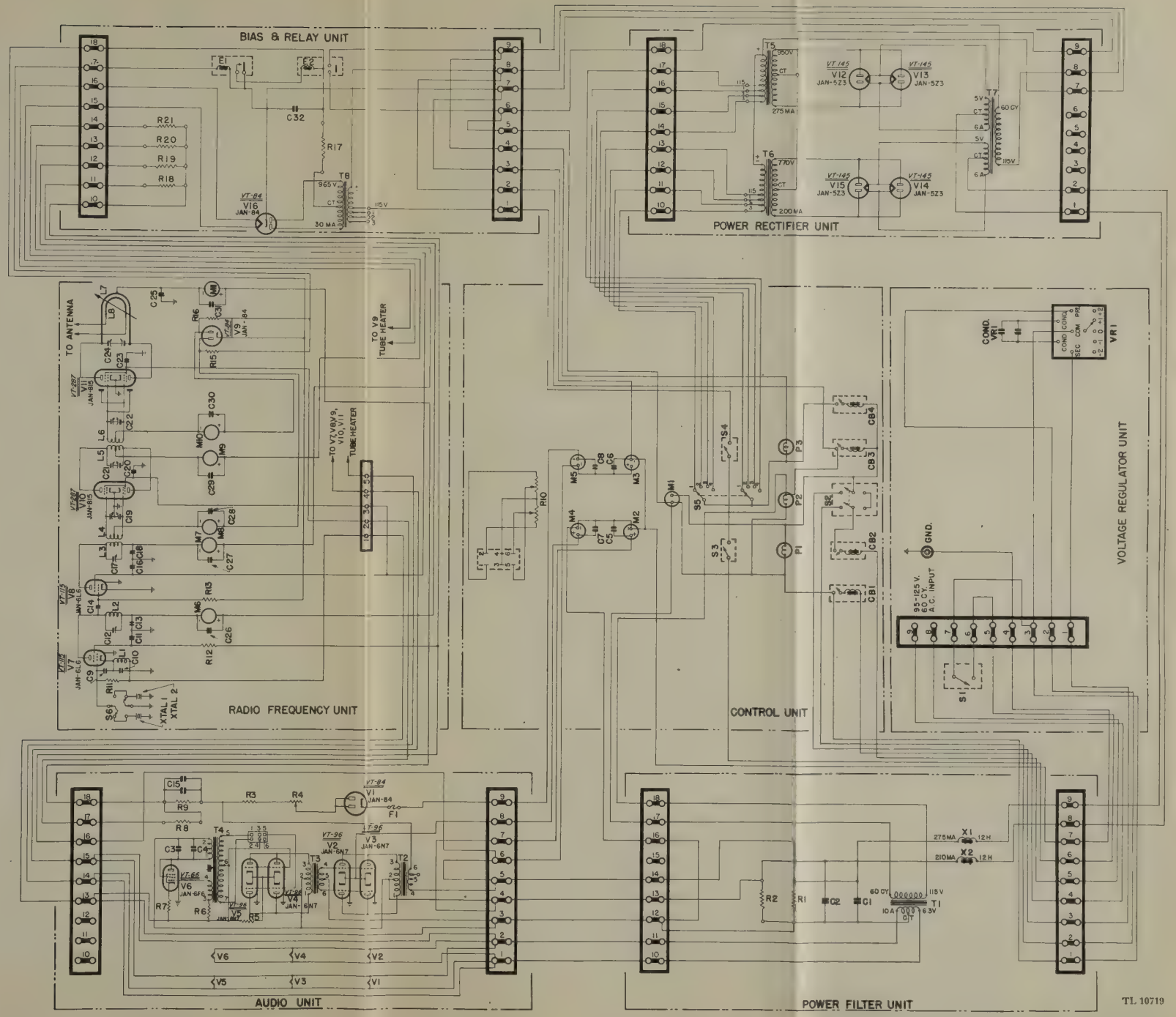

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Figure 47. Radio Transmitter BC-400-G, wiring diagram.

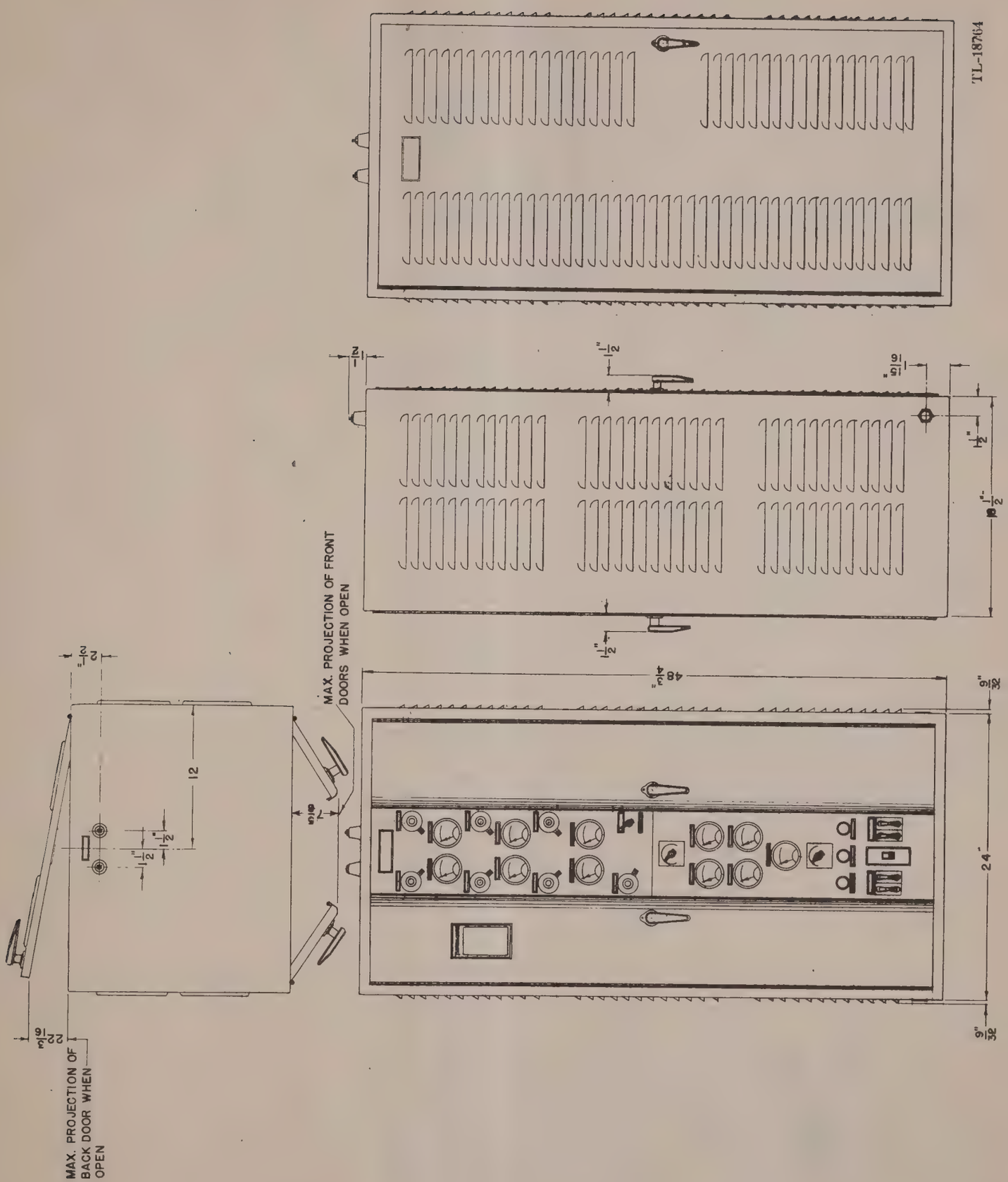

Figure 48

Figure 48. Radio Transmitter BC-400-G, outline diagram.

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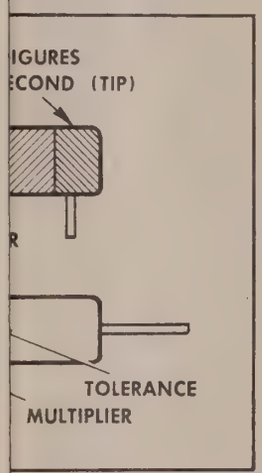
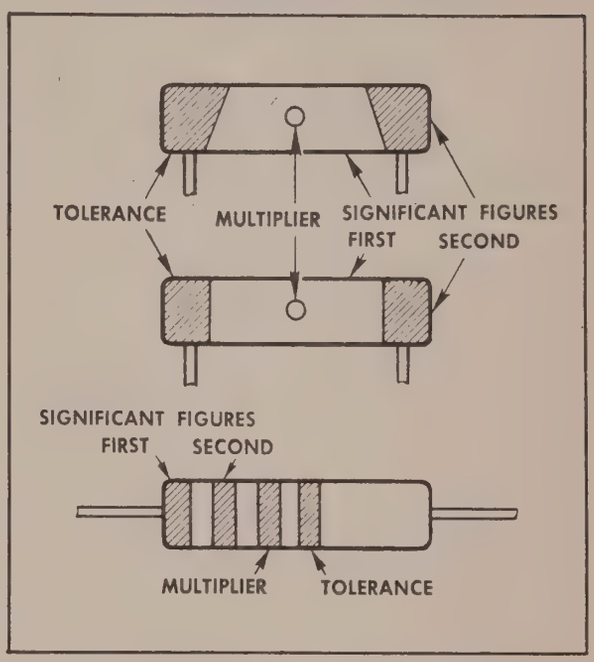
N RESISTORS



resistors with axial
tural tan background
position resistors with
a black background

AWS COLOR CODE FOR
FIXED COMPOSITION RESISTORS



The exterior body color of insulated resistors may be any color except black. The usual color is natural tan. The exterior body color of uninsulated resistors with axial leads may be either black or white. The exterior body color of uninsulated resistors with radial leads may be black or it may be the color of the first significant figure of the resistance value.

ULTIPLIER	TOLERANCE (PERCENT)
1	
10	
100	
1000	
10,000	
100,000	
1,000,000	
0,000,000	
00,000,000	
000,000,000	
0.1	5
0.01	10
	20

RMA: *Radio Manufacturers Association*
AWS: *American War Standard (American Standards Association)*

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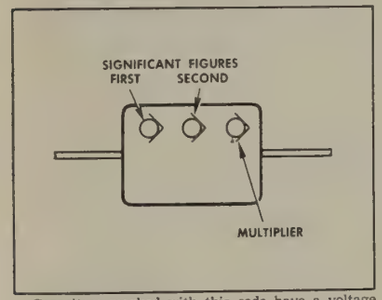
Figure 49. Color codes for capacitors and resistors.

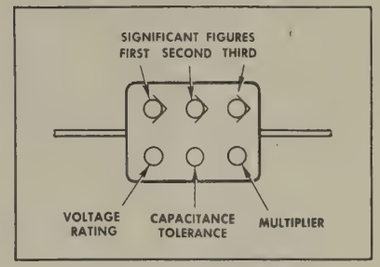
CAPACITOR COLOR CODES

RMA 3-DOT COLOR CODE FOR MICA-DIELECTRIC CAPACITORS

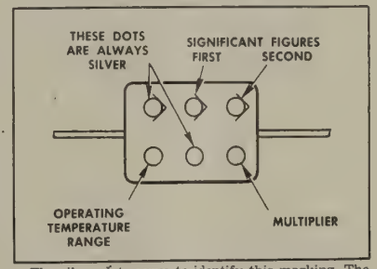


Capacitors marked with this code have a voltage rating of 500 volts.

RMA 6-DOT COLOR CODE FOR MICA-DIELECTRIC CAPACITORS

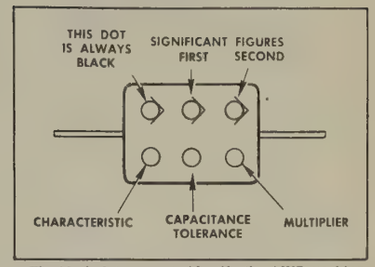


AWS 6-DOT COLOR CODE FOR PAPER-DIELECTRIC CAPACITORS



The silver dots serve to identify this marking. The sixth dot shows whether the capacitor has a maximum operating temperature of 167°F (black) or 185°F (brown).

AWS 6-DOT COLOR CODE FOR MICA-DIELECTRIC CAPACITORS

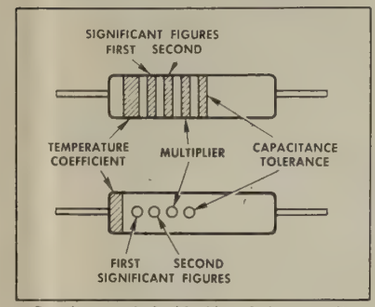


The black dot serves to identify the AWS marking. Capacitors marked with this code are rated at 500 volts, except the following. AWS type CM35 capacitors with capacitances of 6,800, 7,500, and 8,200 micromicrofarads, and AWS type CM40 capacitors with capacitances of 9,100 and 10,000 micromicrofarads are rated at 300 volts.

RMA: *Radio Manufacturers Association*
AWS: *American War Standard (American Standards Association)*

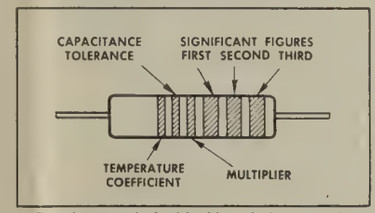
NOTE: These color codes give all capacitances in *micromicrofarads*.

AWS COLOR CODE FOR TUBULAR CERAMIC-DIELECTRIC CAPACITORS



Capacitors marked with this code have a voltage rating of 500 volts.

RMA COLOR CODE FOR TUBULAR CERAMIC-DIELECTRIC CAPACITORS



Capacitors marked with this code have a voltage rating of 500 volts.

COLOR	SIGNIFICANT FIGURE	MULTIPLIER		VOLTAGE RATING (VOLTS)	CHARACTERISTIC (AWS MICA-DIELECTRIC)	CAPACITANCE TOLERANCE				TEMPERATURE COEFFICIENT OF CAPACITANCE x10⁻⁶ MMF/MMF/°C
		RMA MICA- AND CERAMIC-DIELECTRIC AWS MICA- AND PAPER-DIELECTRIC	AWS CERAMIC-DIELECTRIC			RMA & AWS MICA- AND PAPER-DIELECTRIC (PERCENT)	RMA CERAMIC-DIELECTRIC (PERCENT)	AWS CERAMIC-DIELECTRIC GREATER THAN 10 MMF (PERCENT)	AWS CERAMIC-DIELECTRIC LESS THAN 10 MMF (MMF)	
BLACK	0	1	1		A	20	20	20	2.0	0
BROWN	1	10	10	100	B	1	1	1		− 30
RED	2	100	100	200	C	2	2	2		− 80
ORANGE	3	1000	1000	300	D	3	3	2.5	0.25	−150
YELLOW	4	10,000		400	E	4	4			−220
GREEN	5	100,000		500	F	5	5	5	0.5	−330
BLUE	6	1,000,000		600	G	6	6			−470
VIOLET	7	10,000,000		700		7	7			−750
GRAY	8	100,000,000	0.01	800		8	2.5			+ 30
WHITE	9	1,000,000,000	0.1	900		9	10	10	1.0	Not specified
GOLD		0.1		1000		5				
SILVER		0.01		2000		10				
NO COLOR				500		20				

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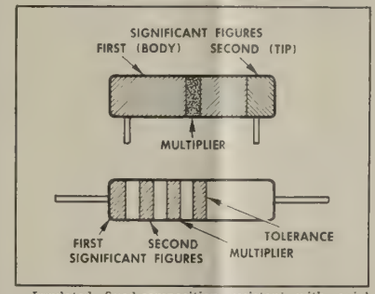
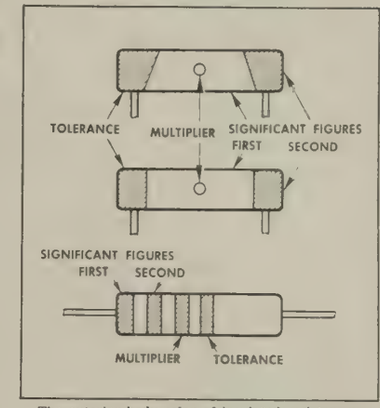
RESISTOR COLOR CODES

RMA COLOR CODE FOR FIXED COMPOSITION RESISTORS



Insulated fixed composition resistors with axial leads are designated by a natural tan background color. Non-insulated fixed composition resistors with axial leads are designated by a black background color.

AWS COLOR CODE FOR FIXED COMPOSITION RESISTORS



The exterior body color of insulated resistors may be any color except black. The usual color is natural tan. The exterior body color of uninsulated resistors with axial leads may be either black or white. The exterior body color of uninsulated resistors with radial leads may be black or it may be the color of the first significant figure of the resistance value

COLOR	SIGNIFICANT FIGURE	MULTIPLIER	TOLERANCE (PERCENT)
BLACK	0	1	
BROWN	1	10	
RED	2	100	
ORANGE	3	1000	
YELLOW	4	10,000	
GREEN	5	100,000	
BLUE	6	1,000,000	
VIOLET	7	10,000,000	
GRAY	8	100,000,000	
WHITE	9	1,000,000,000	
GOLD		0.1	5
SILVER		0.01	10
NO COLOR			20

RMA: *Radio Manufacturers Association*
AWS: *American War Standard (American Standards Association)*

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Figure 49. Color codes for capacitors and resistors.

Appendix

MOISTUREPROOFING AND FUNGIPROOFING

32. PROBLEMS ENCOUNTERED

The operation of Signal Corps equipment in tropical areas where temperature and relative humidity are extremely high requires special attention. The following items represent problems which may be encountered in operation:

a. Resistors, capacitors, coils, chokes, transformer windings, etc., fail.

b. Electrolytic action takes place in resistors, coils, chokes, transformer windings, etc., causing eventual break-down.

c. Hook-up wire and cable insulation break down. Fungus growth accelerates deterioration.

d. Moisture forms electrical leakage paths on terminal boards and insulating strips.

33. TREATMENT

A moistureproofing and fungiproofing treatment has been devised which if properly applied provides a reasonable degree of protection against fungus, insects, corrosion, salt spray, and moisture. The treatment involves the use of a moisture- and fungi-resistant varnish applied with a spray gun or brush. Refer to TB SIG 13, Moistureproofing and Fungiproofing Signal Corps Equipment, for a detailed description of the varnish-spray method of moistureproofing and fungiproofing and the supplies and equipment required in this treatment.

CAUTION.—Varnish spray may have toxic effects if inhaled. To avoid inhaling spray, use respirator if available; otherwise, fasten cheesecloth or other cloth material over nose and mouth.

34. STEP-BY-STEP INSTRUCTIONS FOR TREATING CONTROL UNIT

a. Preparation. Make all repairs and adjustments necessary for the proper operation of the equipment.

b. Disassembly.

(1) Remove Jones plug from receptacle (SO-PG1) located in lower right corner of audio unit (fig. 35).

(2) Disconnect four cable leads from control unit to terminal strip TS1 of audio unit at TS1 (fig. 35).

(3) Disconnect three cable leads from control unit to terminal strip TS6 of power filter unit at TS6 (fig. 34).

(4) Disconnect seven-wire cable from control unit to terminal strip TS2 of power filter unit at TS2 (fig. 34).

(5) Disconnect all cable leads from control unit to terminal strip TS4 of bias and relay unit at TS4 (fig. 37).

(6) Disconnect all cable leads from control unit to terminal strip TS5 of power rectifier unit at TS5 (fig. 36).

(7) Remove six screws from edges of control unit panel (three at each end) (fig. 13).

(8) Remove control unit from cabinet.

(9) Clean all dirt, rust, fungus, oil, grease, etc., from equipment to be processed. Thorough cleaning of unit is necessary to prevent sealing in dirt with lacquer. It is imperative that rust or corrosion be removed with fine sandpaper or by scraping. A solvent, such as Solvent, Drycleaning, Federal Spec No. P-S-661a, will remove grease and oil. A blower or compressed air hose, if available, is useful for removing dust and loose dirt.

(10) No further disassembly of control unit required.

Note.—All screws, bolts, etc., should be replaced in their original positions after being removed. This will prevent clogging and stripping of threads and loss of screws thereby simplifying reassembly. Tighten firmly all screw contacts (meters, terminal strips, etc., where it is not necessary to disconnect leads). This will prevent lacquer from getting on contact surfaces of terminals.

c. Masking.

(1) FRONT OF CONTROL UNIT (fig. 13).

(*a*) Mask glass and zero adjusting screws of all meters.

(*b*) Cover the four circuit breakers (marked A.C. Line, TRANS. FIL. and TRANS. PLATE) with masking tape.

(*c*) Mask voltage regulator selector switch with masking tape.

(2) BACK OF CONTROL UNIT (fig. 18).
   (*a*) Mask a joint between meter and meter case of meters M1, M2, M3, M4, and M5 to prevent lacquer spray from sealing meters (fig. 18).
   (*b*) Completely mask plate voltage switch S5. Stuff tissue between wafers, and cover entire switch with masking tape (fig. 18).

Note.—Loosen cables sufficiently from chassis so that lacquer can be applied over entire surface. This pertains to all components.

d. Drying.
(1) Place the equipment in drying oven and bake for 6 hours at 140°F.
(2) If wax should begin to melt on any of components, lower baking temperature and increase the baking time. For each 10° drop in baking temperature, increase baking time 1 hour.

e. Varnishing.
(1) Apply three coats of moistureproofing and fungiproofing varnish (Lacquer, Fungus-resistant, Spec No. 71-2202 (Stock No. 6G1005.3), or equal) with spray gun. Allow each coat to dry 15 to 20 minutes before applying the next coat.
(2) Inspect treated equipment and apply varnish with a brush to those portions not reached by spray gun. Be sure all components are adequately protected by varnish.

f. Reassembly
(1) Remove all masking tape.
(2) Clean all contacts with varnish remover, and burnish contacts.
(3) Reassemble equipment by following disassembly instructions in reverse order.
(4) Check over-all performance of equipment.

g. Marking. Mark cases with "MFP" and the date of treatment. EXAMPLE: MFP—8 June 1944.

35. STEP-BY-STEP INSTRUCTIONS FOR TREATING RADIO-FREQUENCY UNIT

a. Preparation. See paragraph 34a.

b. Disassembly.
(1) Disconnect six-wire cable from r-f unit to terminal strip TS7 of audio unit at TS7 (fig. 35).
(2) Disconnect nine-wire cable from r-f unit to terminal strip TS8 of bias and rectifier unit at TS8 (fig. 37).
(3) Disconnect leads to antenna coupling terminals (fig. 36).
(4) Remove six screws from edges of r-f unit (three at each end) (fig. 12).
(5) Remove r-f unit from cabinet.
(6) Remove crystals XTAL 1, and XTAL 2 (fig. 11).
(7) Remove tubes V7, V8, V9, V10, and V11 (fig. 10).
(8) For cleaning instructions, see paragraph 34b(9).

c. Masking.
(1) FRONT OF RADIO-FREQUENCY UNIT. Mask glass faces and zero adjusting screws of all meters.
(2) BACK OF RADIO-FREQUENCY UNIT (fig. 11).
   (*a*) Mask top and bottom of all tube sockets.
   (*b*) Completely cover inductor links L7 and L8 (fig. 11).
   (*c*) Mask all insulators.
   (*d*) Completely mask variable air capacitors C17, C19, C21, C22, and C24 (figs. 10 and 11).
   (*e*) Mask crystal holder contact slips (figs. 10 and 11).
   (*f*) Mask neutralizing adjustments (figs. 10 and 11).
   (*g*) Mask the four plate clips.
   (*h*) Mask coils L5 and L6. Do not mask end of coil form as it is desirable to lacquer inside of coil form (figs. 10 and 11).
(3) BOTTOM OF RADIO-FREQUENCY UNIT.
   (*a*) Completely mask capacitors C12 and C14 (fig. 42).
   (*b*) Mask coil L2, but do not mask ends of coil form (fig. 42).
   (*c*) Completely mask crystal switch S6 (fig. 42).
   (*d*) Mask bottoms of all tube sockets.

d. Drying. See paragraph 34d.

e. Varnishing. See paragraph 34e.

f. Reassembly. See paragraph 34f.

g. Marking. See paragraph 34g.

36. STEP-BY-STEP INSTRUCTIONS FOR TREATING AUDIO UNIT

a. Preparation. See paragraph 34a.

b. Disassembly.

(1) Disconnect five remaining leads from terminal strip TS1 of audio unit (fig. 35).
(2) Remove six screws from edges of audio unit (three at each end) (fig. 35).
(3) Remove audio unit from cabinet.
(4) Remove resistors R8 and R9 (fig. 39).
(5) Remove fuse F1 (fig. 35).
(6) Remove tubes V1, V2, V3, V4, V5, and V6 (fig. 39).
(7) For cleaning instructions, see paragraph 34b(9).

c. Masking.

(1) FRONT OF AUDIO UNIT.
  (*a*) Place masking tape over all disconnected terminals on terminal strips TS7 and TS1, crimping the tape firmly. This will allow lacquer to cover part of each terminal strip (fig. 35).
  (*b*) Mask bottoms of tube sockets.
  (*c*) Mask end of shaft of potentiometer R4 (fig. 35).
  (*d*) Mask Jones plug receptacle SO-PG1 (fig. 35).
  (*e*) Mask fuse clips of fuse socket F-1 (fig. 35).
(2) BACK OF AUDIO UNIT (fig. 39).
  (*a*) Mask clips that hold resistors R8 and R9.
  (*b*) Mask adjusting screw on transformer T4.
  (*c*) Mask tops of all tube sockets.

d. Drying. See paragraph 34d.

e. Varnishing. See paragraph 34e.

f. Reassembly. See paragraph 34f.

g. Marking. See paragraph 34g.

37. STEP-BY-STEP INSTRUCTIONS FOR TREATING POWER FILTER UNIT

a. Preparation. See paragraph 34a.

b. Disassembly.

(1) Disconnect all nine leads from bottom row of contacts on terminal strip TS2 on power filter unit (fig. 34).
(2) Remove six screws from edges of power filter unit, (three at each end) (fig. 34).
(3) Remove power filter unit from cabinet.
(4) Remove resistors R1 and R2 (fig. 38).
(5) For cleaning instructions, see paragraph 34b(9).

c. Masking.

(1) FRONT OF POWER FILTER UNIT. Mask disconnected terminals on terminal strips TS2 and TS6 with masking tape and crimp firmly about contacts (fig. 34).
(2) BACK OF POWER FILTER UNIT (fig. 38). Mask clips that hold resistors R1 and R2.

d. Drying. See paragraph 34d.

e. Varnishing. See paragraph 34e.

f. Reassembly. See paragraph 34f.

g. Marking. See paragraph 34g.

38. STEP-BY-STEP INSTRUCTIONS FOR TREATING BIAS AND RELAY UNIT

a. Preparation. See paragraph 34a.

b. Disassembly.

(1) Disconnect remaining leads to terminal strip TS4 on bias and relay unit at TS4 (fig. 37).
(2) Remove six screws from edges of bias and relay unit (three at each end) (fig. 37).
(3) Remove bias and relay unit from cabinet.
(4) Remove resistors R17, R18, R19, R20, and R21 (fig. 40).
(5) Remove tube V16 (fig. 40).
(6) For cleaning instructions, see paragraph 34b(9).

c. Masking.

(1) FRONT OF BIAS AND RELAY UNIT (fig. 37).
  (*a*) Mask disconnected terminals on terminal strips TS4 and TS8 with masking tape and crimp firmly about contacts.
  (*b*) Completely cover with paper and masking tape relays E1 and E2.
  (*c*) Mask bottoms of tube socket V16.
(2) BACK OF BIAS AND RELAY UNIT (fig. 40).
  (*a*) Mask clips that hold resistors R17, R18, R19, R20, and R21.
  (*b*) Mask top of tube socket V16.

d. Drying. See paragraph 34d.

e. Varnishing. See paragraph 34e.

f. Reassembly. See paragraph 34f.

g. Marking. See paragraph 34g.

39. STEP-BY-STEP INSTRUCTIONS FOR TREATING POWER FILTER UNIT

a. Preparation. See paragraph 34a.

b. Disassembly.

(1) Disconnect all leads along bottom row of terminal strip TS3 on power rectifier unit (fig. 36).
(2) Remove six screws from edges of power rectifier unit (three at each end) (fig. 36).
(3) Remove power rectifier unit from cabinet.
(4) Remove tubes V12, V13, V14, and V15 (fig. 17).
(5) For cleaning instructions, see paragraph 34b(9).

c. Masking.

(1) FRONT OF POWER RECTIFIER UNIT (fig. 36).
   (*a*) Mask disconnected terminals on terminal strips TS3 and TS5 with masking tape.
   (*b*) Mask bottoms of all tube sockets.
(2) BACK OF POWER RECTIFIER UNIT (fig. 17). Mask tops of all tube sockets.

d. Drying. See paragraph 34d.

e. Varnishing. See paragraph 34e.

f. Reassembly. See paragraph 34f.

g. Marking. See paragraph 34g.

40. STEP-BY-STEP INSTRUCTIONS FOR TREATING VOLTAGE REGULATOR VR1 (Fig. 9)

a. Preparation. See paragraph 34a.

b. Disassembly.

(1) Disconnect cable of voltage regulator from terminal strips, ground stud, and VR1 capacitors.
(2) Remove voltage regulator from cabinet.
(3) Remove end panel covering terminal board and tap settings.
(4) Remove top cover of voltage regulator by taking out holding screws.
(5) For cleaning instructions, see paragraph 34b(9).

c. Masking. Mask contacts on tap selector terminal board with masking tape, and crimp firmly about contacts.

d. Drying. See paragraph 34d.

e. Varnishing. See paragraph 34e.

f. Reassembly. See paragraph 34f.

g. Marking. See paragraph 34g.

41. MASKING WIRE-WOUND PLUG-IN RESISTORS

Mask contact surface thoroughly. Do not mask ends of resistors as it is important to spray inside of resistor. This applies to resistors R1, R2, R8, R9, R17, R18, R19, R20, and R21.

Order No. 596-WF-43
2-8-45